# Pharmacists' attitudes and perception of using pictograms as a communication tool in practice

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# ABSTRACT

Pictograms, when used in conjunction with verbal and written information, are known to be effective in improving comprehension and recall of medicines information and in supporting communication between healthcare professionals and patients. However, pictograms are seldom used in routine pharmacy practice, and little is known about pharmacists' opinions of pictograms and their intention to possibly incorporate pictograms into routine practice. This study aimed to investigate pharmacists' opinions relating to pictograms as a communication tool, and, by applying the Theory of Planned Behaviour (TPB), to explore their intention to use pictograms in pharmacy practice as well as the barriers to their use.

The quantitative study design involved a two-phase approach. Phase 1 was a descriptive, cross-sectional online national survey of pharmacists. The 70-item, four-section survey was primarily based on the constructs of TPB, which included attitude, intention, subjective norm, and perceived behavioural control. The last survey section recruited pharmacists for a follow-up Phase 2 survey. Following a pilot study, the survey was emailed to all pharmacists registered with the South African Pharmacy Council. Descriptive statistics for survey items were generated. Pearson correlation investigated the correlation between participant characteristics, familiarity with pictograms and use of pictograms in practice. Structural Equation Modelling (SEM) determined if there was a significant relationship between attitude, subjective norm and perceived behavioural control with intention to use pictograms.

A total of 426 pharmacists responded to the Phase 1 survey. Most pharmacists were familiar with the term 'pictogram'; however, over three-quarters of pharmacists had never observed pictograms being routinely used in a pharmacy setting. When presented with pictograms designed for a low health literate population, most pharmacists thought the design and overall look of the pictograms would be easy for most patients in South Africa to understand (71.6 ± 24.0). Two-thirds of pharmacists (65.0 ± 30.6), felt that pictograms should be used for all patient populations. More than 85% of pharmacists agreed that pictograms should be used for dosage instructions, auxiliary or additional information, warnings, and storage instructions. However, fewer (58-68%) felt that indication, side effects and risk communication information should be accompanied by pictograms.

Pharmacists demonstrated positive attitudes towards using pictograms in practice (mean = 4.2 ± 0.9; range: 1 - 5), while perceived behavioural control (mean = 3.0 ± 1.2; range: 1 - 5), subjective norm (mean = 3.8 ± 1.0; range 1 - 5) and intention (mean = 3.3 ± 1.0; range 1 - 5) were all neutral. Attitude ($\beta = -0.25$, $p < 0.117$), however, was not a significant predictor of intention while perceived behavioural control ($\beta = -0.83$, $p < 0.000$) presented with a significant negative correlation with intention. Subjective norm ($\beta = 0.57$, $p < 0.000$) was the strongest predictor of intention. Scale reliability ranged from 0.770 to 0.865 for the TPB constructs.

Phase 2 aimed to expand on, and further investigate Phase 1 findings relating to current and intended pharmacist behaviour and opinions concerning pictogram usage. As Phase 2 looked to investigate issues in greater depth, questions included open-ended response options. The survey link was emailed to all pharmacists who had voluntarily offered to participate in Phase 2. Frequency data for all questions were generated, and content analysis was undertaken for the free-response comments offered by pharmacists.

A total of 35 pharmacists responded to the Phase 2 survey. Most pharmacists who routinely used pictograms initiated their use with support from pharmacists' colleagues (8/12) and their supervisor/manager (6/7). Pharmacists who stated their intention to use pictograms anticipated receiving support from their pharmacists' colleagues (18/23) and manager/supervisor (15/23). All 12 pharmacists who were routinely using pictograms reported a positive effect on patient communication, with almost all having encountered no negative aspects of using pictograms (11/12). Almost all pharmacists intending to use pictograms could foresee benefits from their use (22/23). Misinterpretation of pictograms was a prevalent barrier common to both pharmacists routinely using pictograms and to those intending to use pictograms. Increased workload was regarded as a prevalent barrier only by pharmacists intending to use pictograms.

This study was the first national study of pharmacists to investigate their opinion of pictograms and their use and to adopt a theoretical approach to consider pharmacist intention to use pictograms in routine pharmacy practice. Pharmacists generally expressed positive attitudes to pictograms but showed inadequate understanding of pictogram use. Pharmacists using pictograms reported the positive effect of pictograms on their patient communication, whereas those planning to use pictograms could foresee the benefits of using pictograms despite regarding increased workload as a barrier. As the strongest predictor of intention was subjective

norm, this construct should therefore be targeted to motivate pharmacists to adopt the use of pictograms.

# ACKNOWLEDGEMENTS

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Finally, a massive thank you to all the people who have supported me to complete this research work directly or indirectly.

# DEDICATION

*"I think a hero is any person really intent on making this a better place for all people."*

*Maya Angelou*

**This thesis is dedicated to all healthcare workers who are on the frontlines battling COVID-19 as they are putting themselves at risk to help others during this unprecedented pandemic.**

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| | |
|---|---|
| ANSI | American National Standard Institute |
| CFI | Comparative fit index |
| COVID-19 | Coronavirus 2019 |
| FIP | International Pharmaceutical Federation |
| HCP | Healthcare Professional |
| HIC | High-income country |
| ISO | International Standards Organisation |
| KMO | Kaiser-Meyer-Oklin |
| LMIC | Low-to-Middle-income country |
| NDoH | National Department of Health |
| NGO | Non-governmental organisation |
| NPO | Non-profit organisation |
| PBC | Perceived behavioural control |
| PHC | Primary Health Clinic |
| PIP | Pharmacist intending to use pictograms |
| PUP | Pharmacist using pictograms |
| RD | Supervisor |
| RMSEA | Root mean square error of approximation |
| SAPC | South African Pharmacy Council |
| SEM | Structured Equation Modelling |
| SN | Subjective norm |
| SO | Researcher |
| SRMR | Standardized root mean square residual |
| TB | Tuberculosis |
| TPB | Theory of Planned Behaviour |
| TRA | Theory of Reasoned Action |
| UIS | UNESCO Institute for statistics |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| USPC | United States Pharmacopeial Convention |
| USP | United States Pharmacopeia |
| WHO | World Health Organisation |

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# CHAPTER 1
# INTRODUCTION

## 1.1 Background to research

Medicines are critical in the treatment, cure and prevention of numerous conditions and must be used appropriately to ensure optimal adherence. Although pharmacists play a crucial role in ensuring the safe supply and appropriate use of medicines (1), this role has evolved to an increased clinical focus as the profession has implemented pharmaceutical care services and started to take responsibility for patient-centred practice (2). A critical component of patient-centred practice is communication, thus pharmacists are required to develop and apply appropriate communication skills (3). Most pharmacist-patient communication is verbal, where barriers to communication such as language differences and low retention of verbal information have been reported (2).

Interventions such as visual tools or pictograms have been utilized as aids to communication, and have been shown to improve comprehension and recall of medicines information, either used with verbal counselling or included in written information materials (3,4). However, pictograms are seldom used in routine pharmacy practice, and there is a lack of evidence in the literature of pharmacists' general opinions of pictograms or of possible intentions of incorporating pictograms in routine practice.

## 1.2 Significance of the study

South Africa consists of a population with a high burden of disease, including both infectious and non-communicable diseases (6). Medicine is the mainstay of treatment of these diseases but must be used appropriately to ensure optimal adherence. National statistics show that, amongst our population, 13.3% are considered to be functionally illiterate (7). Accordingly, many patients in this country are likely to experience difficulty with accessing or understanding written information, or to recall verbal information easily. The low literacy levels, along with a high incidence of inadequate health literacy shown by preliminary health literacy data (8), highlights the potentially high risk of non-adherence in this population.

Pharmacists play a crucial role in reducing non-adherence by ensuring appropriate medication use by counselling and educating patients; however, most pharmacist-patient communication is verbal, which can result in barriers to communication being encountered. The use of well-designed pictograms to facilitate pharmacist-patient communication is a potential way to overcome communication issues.

Intervention studies using pictograms have been conducted in healthcare settings, but many are cross-sectional once-off studies, with very few longitudinal studies generating quality evidence to support their use in routine practice. Investigating and understanding pharmacist opinion and intention to using pictograms in routine practice can pave the way to translating pictogram research into routine practice. However, a preliminary literature search revealed that no research had formally investigated pharmacist opinion or intention to using pictograms in routine practice. It is hoped that this thesis will make a significant contribution to addressing this gap in the literature.

### 1.3 Aims and Objectives

This research aims to investigate pharmacists' opinions relating to pictograms as a communication tool, their intention to use pictograms in pharmacy practice using the Theory of Planned Behaviour (TPB), and to investigate barriers to the possible adoption of pictograms in practice.

This will be achieved through the following objectives:

- Survey pharmacists to determine the following:
    - familiarity with, and opinion of, pictograms as a communication tool
    - opinion of incorporating pictograms into routine practice
    - attitude, subjective norm, and perceived behavioural control towards pictogram use in routine practice
    - barriers and facilitators related to pictogram use in routine practice.
- Conduct an investigation of current and intended pharmacist behaviour and opinions concerning pictogram usage through the quantitative investigation of:

- support received from other Healthcare Professionals (HCPs) by pharmacists using pictograms, and anticipated support reported by pharmacists intending to use pictograms.
- the influence of current/anticipated pictogram usage on routine pharmacy practice.
- investigation of pharmacists' opinion of patient response to pictograms.
- investigation of barriers identified in Phase 1 encountered/anticipated by pharmacists currently using pictograms, and those intending to use pictograms, respectively.

### 1.4 Theoretical framework

A theoretical model was developed for the specific aim of this study to investigate pharmacists' opinion relating to pictograms as a communication tool, investigate intention to use pictograms in pharmacy practice and investigate barriers to intended adoption of pictograms in practice. The two most thoroughly tested and robust social psychological models employed to explain and predict HCPs' intention are the Theory of Reasoned Action (TRA) and TPB (9,10).

The TRA (11) assumes that if individuals evaluate behaviour in a positive light and if they believe influential individuals will positively view the behaviour, they will have the intention to perform the behaviour (12). The TRA is composed of two constructs: attitude and subjective norm (Figure 1.1) (13). Attitude is the degree to which a person has a favourable or unfavourable evaluation towards the behaviour in question, and subjective norm is the perceived social pressure to perform or not to perform the behaviour (14).

The TRA has been criticized due to its limited application to behaviours that are not under a person's volitional control (15). An individual's intention to perform a behaviour should be indicative of the amount of effort they are willing to make (14); however even the most tedious of behavioural intentions, such as brushing your teeth in the morning, can be hindered if your toothpaste is unavailable.

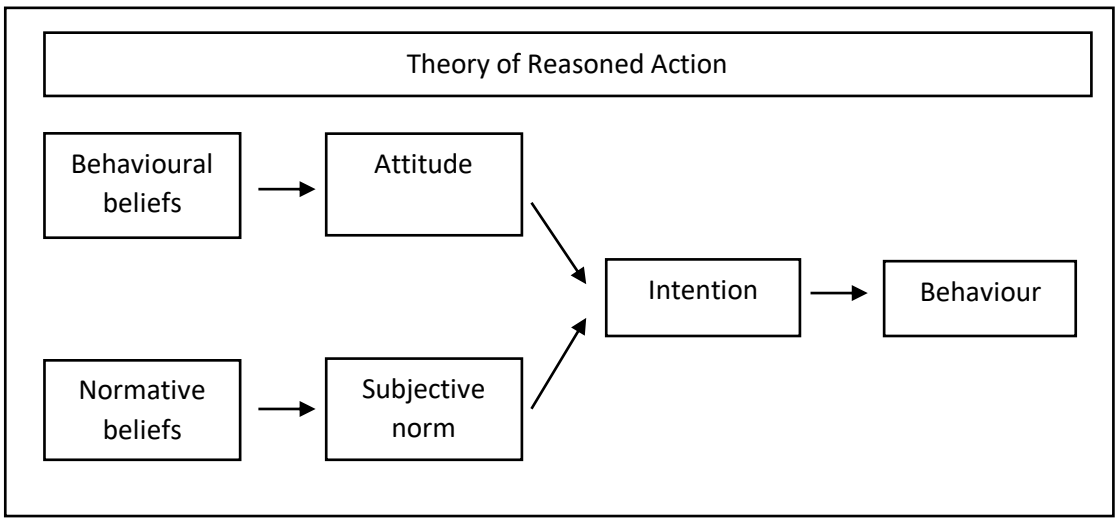

Figure 1.1: Theory of Reasoned Action model. Source: (Ajzen & Madden, 1986) (15)

Very few human behaviours are under complete volitional control, thus to account for the influence of volitional control, the TPB was developed as an extension of the TRA (Figure 1.2) (14,15). The TPB includes the additional construct of perceived behavioural control, which is defined as the perceived ease or difficulty of performing the behaviour, and it is assumed to reflect past experiences as well as anticipated barriers and facilitators (14).

Behavioural intentions and performance can also be influenced by external factors, although these are not considered as a construct in the TPB model (16). Factors that are not part of the TPB theory include demographics such as gender and age, and additional variables can be included in the TPB model. Researchers have utilized the TPB model to investigate behaviours associated with pharmacy practice, such as providing pharmaceutical care and medication therapy management (17,18), and to explain factors related to pharmacists' behaviours (17,19–21).

As mentioned, most behaviours are not under a person's complete volitional control, and this is particularly applicable to pharmacists. Based on the TPB's inclusion of the perceived behavioural control construct, TPB is the most appropriate model to assess pharmacist planned intention and perceived barriers and facilitators to using pictograms as a communication tool in pharmacy practice.

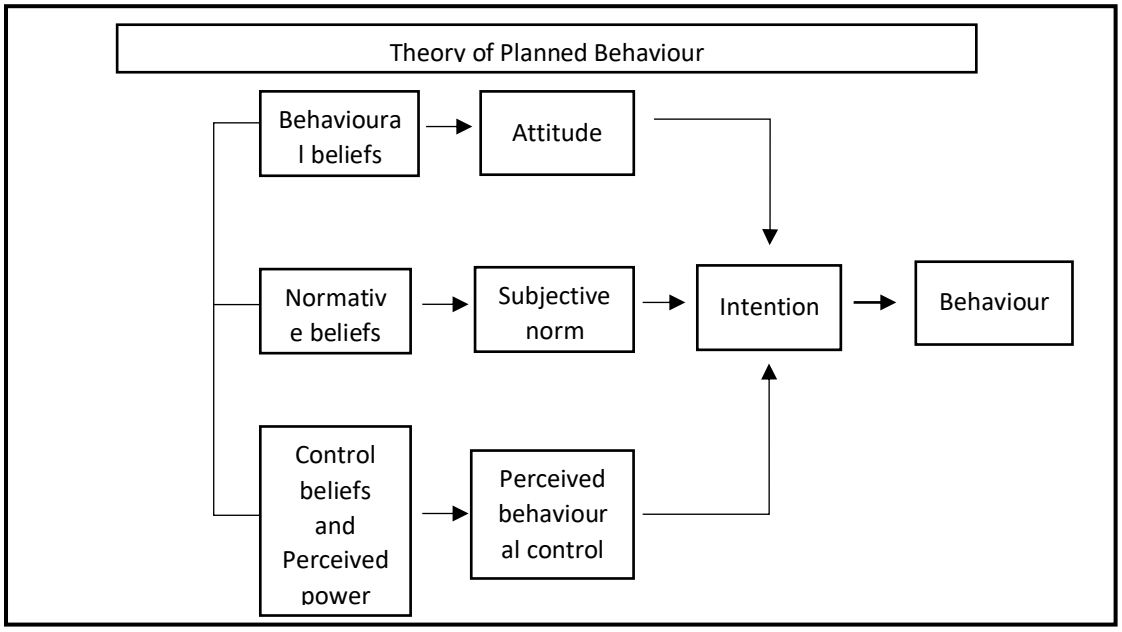

Figure 1.2: Theory of Planned Behaviour model. Source (Ajzen, 1991) (14)

The model for this study is an extension of the TPB, including demographic and practice factors as they have been shown to predict HCPs' intention (22,23). Figure 1.3 below illustrates the theoretical model for this study.

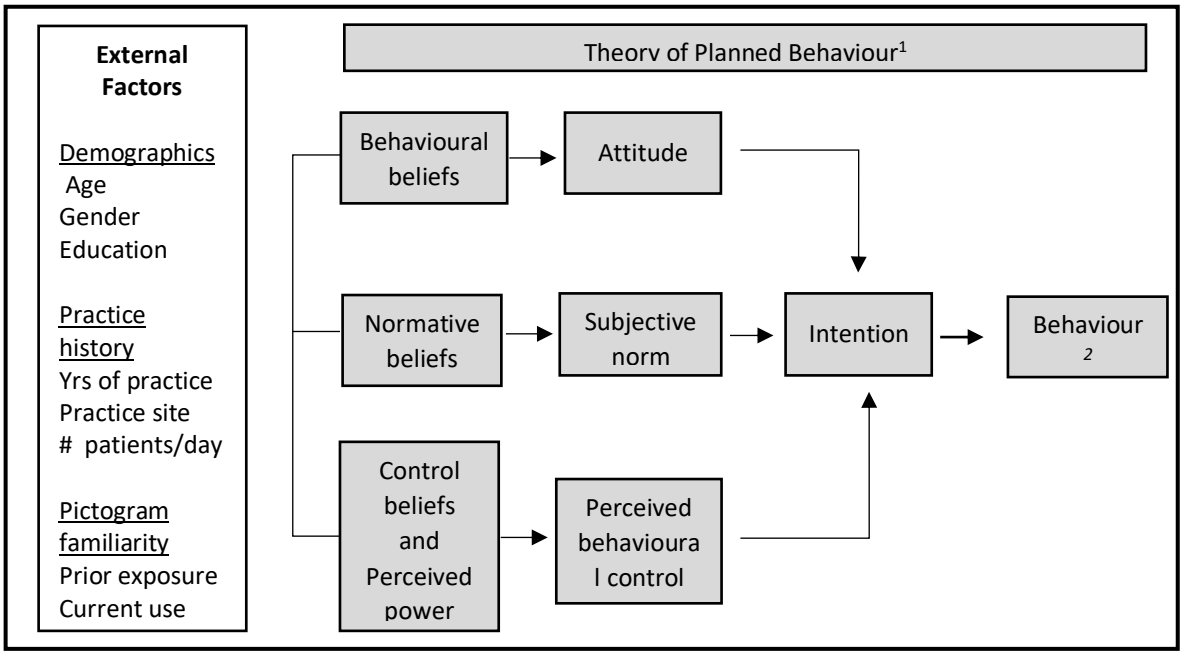

Figure 1.3: Theoretical framework based on the TPB to explore pharmacist planned intention and perceived barriers to using pictograms as a communication tool
[1]*The shaded boxes display the components of the TPB*
[2]*This component of the TPB is not addressed in this study*

## 1.5 Overview of phases of the study and chapter summaries

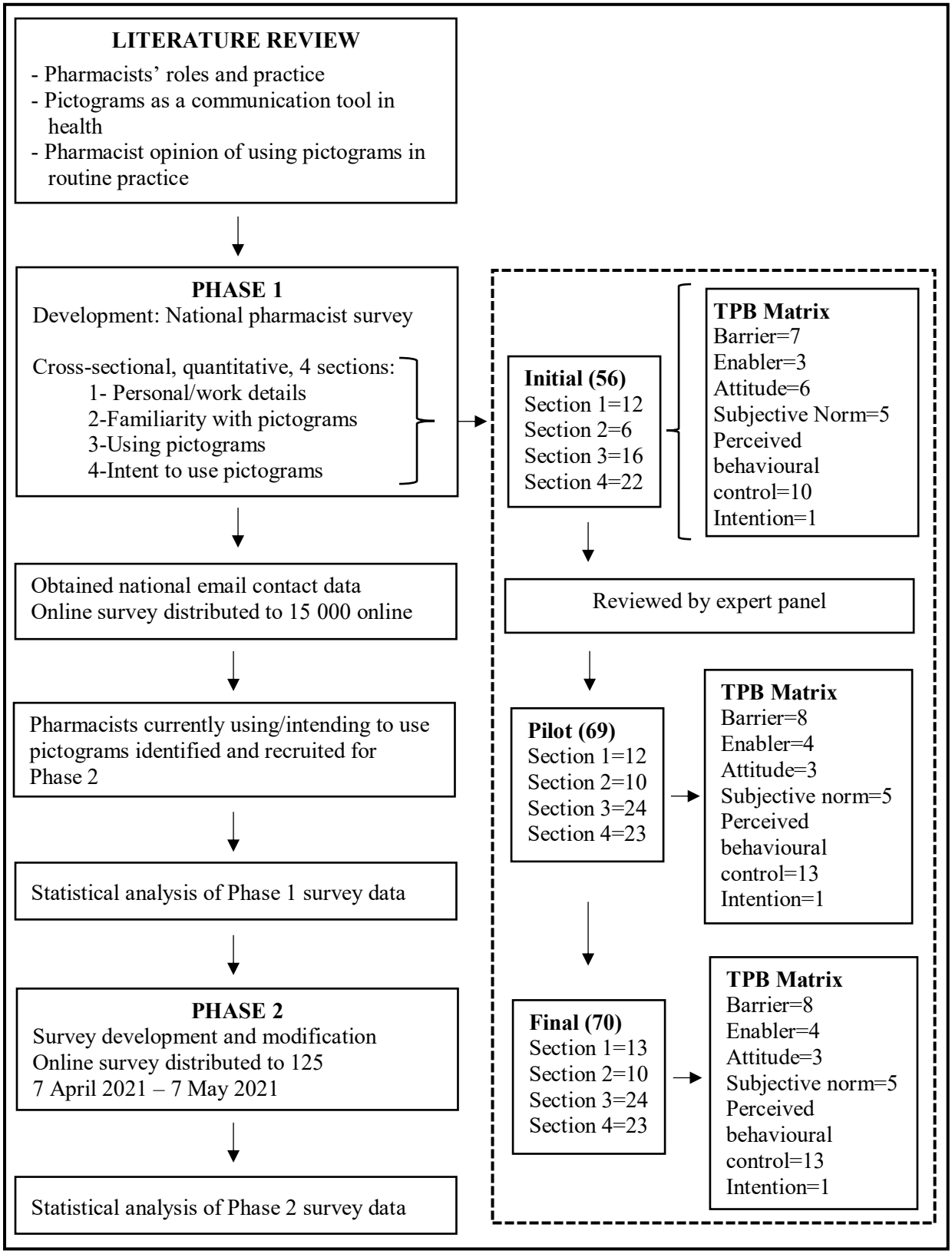


Figure 1.4: Flow diagram of study phases

Chapter 2 is a literature review that begins with a description of pharmacists' roles and practices, followed by pharmacists' extended roles in High-income countries (HICs) and Low-to-Middle-income countries (LMICs). The concept of pharmacist-patient communication is then introduced with literature on verbal and written communication, barriers to communication and the effect of Coronavirus-2019 (COVID-19) on communication. A focus on pictograms as a communication tool in health and a description of the South African healthcare system is included. An in-depth literature review to investigate pharmacists' opinion of using pictograms in routine practice is described, and the findings discussed.

Chapter 3 describes the study design and methodology used for Phase 1, providing details of ethical considerations, study population, data collection and analysis. The development of the online national survey as the primary research tool is described.

Chapter 4 reports Phase 1 results. Results regarding pharmacists' familiarity with pictograms, opinions relating to pictograms in healthcare and the attitude, intention, subjective norm, and perceived behavioural control of pharmacists towards pictogram use in routine pharmacy practice are presented. Significant correlation and structural equation modelling results of the TPB are shown.

Chapter 5 reports the methodology, data collection and analysis used for Phase 2. The development of the Phase 2 online survey, which included frequent open-ended responses to investigate issues in greater detail, is described. The results of the study are reported including pharmacists' characteristics, support pharmacists received or anticipated receiving with initiating pictograms, the influence of pictogram use on patients and pharmacist practice, and barriers to pictogram use.

Chapter 6 discusses the study findings and contextualises them within the literature. Lastly, the limitations of the study are described.

Chapter 7 concludes the thesis by reflecting on the study aims and objectives in relation to the findings and provides recommendations for future research.

# CHAPTER 2
# LITERATURE REVIEW

## 2.1 Pharmacist roles and practices

Pharmacy is the health profession that has the responsibility for ensuring the safe, effective, and rational use of medicines. Pharmacists play a crucial role in the healthcare team by providing quality healthcare and pharmaceutical care to the public. With their expertise in medicines, pharmacists ensure the safe supply and appropriate use of medicines by the public. In recent decades, pharmacists' roles and responsibilities have significantly evolved, historically focusing on medication compounding and dispensing, but over the years shifting to an increased clinical focus with pharmaceutical care services and patient-centred practice (24).

Due to increasing pressure on the healthcare system and complex, chronic medication regimens, along with an increase in poor adherence to prescribed medication, a more patient-centred approach has been adopted. This shift in pharmacy practice started in the 1990s, stimulated by Hepler and Strand's work on the concept of 'pharmaceutical care' (25). Globally, pharmacy organisations and academic training programmes have adopted pharmaceutical care as a philosophy and standard of provision of care for patients. The pharmaceutical care concept has placed greater responsibility on the pharmacy profession for patient care, and more specifically, to ensure that a patient achieves optimal health outcomes from pharmacotherapy (24–26).

The World Health Organisation (WHO) has suggested that pharmacists play a role primarily in quality assurance and the safe and effective administration of medicine (27). The 'seven-star pharmacist' concept developed by the WHO defines the roles of a pharmacist as being a caregiver, decision-maker, communicator, leader, manager, life-long learner and teacher (26). Figure 2.1 depicts the seven-star pharmacist model.

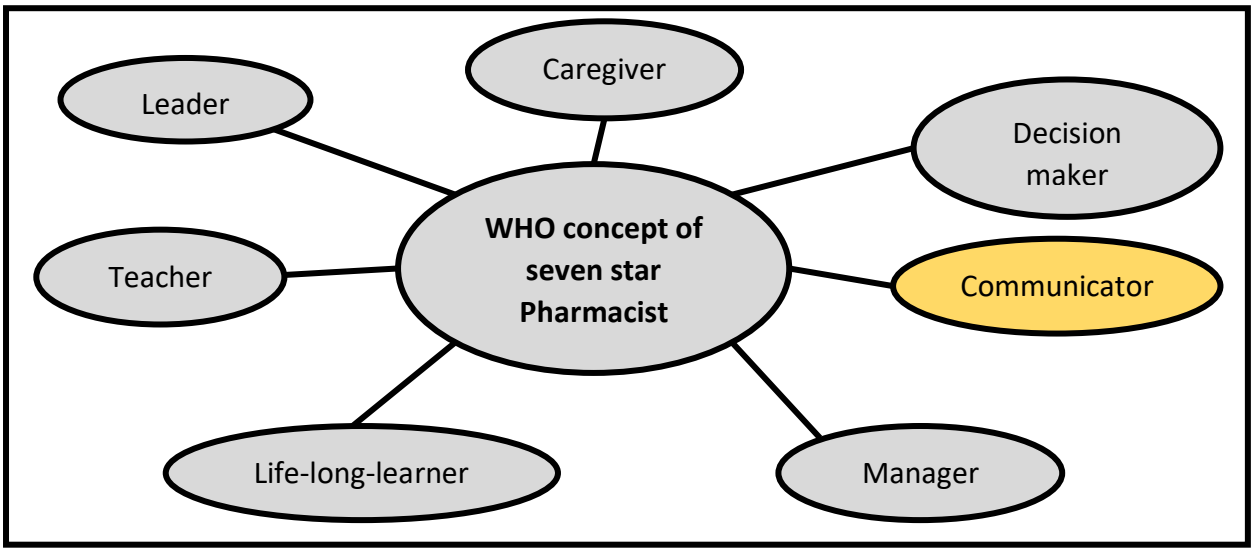

Figure 2.1: The seven-star pharmacist model

This research focuses primarily on the role of a pharmacist as a communicator in educating and counselling patients, with modes of communication including verbal, non-verbal, listening and writing skills (28,29). The pharmacist is ideally placed between physician and patient to facilitate patient comprehension of the recommendations and medication prescribed by the physician. The seven-star pharmacist concept emphasizes that the well-rounded pharmacist should be not only the link between physicians and patients but also the link between other HCPs and patients. For effective communication to happen, pharmacists must be knowledgeable about all pharmaceuticals, including those with recent updates, and should be confident while communicating with other HCPs and with community members. Effective patient communication skills help build the necessary rapport between pharmacist and patient to form a trusting relationship, thereby facilitating the ability of the pharmacist to identify a patient's problem and requirements, while ensuring the exchange of sufficient information to fully appreciate the patient needs. Good communication also enables the patient to understand and accept recommendation from the pharmacist, enhancing the pharmaceutical care process.

There is a broad spectrum of activities consisting of educating and counselling patients regarding disease states, prevention of disease, self-care, enhancing health literacy, and lifestyle, including diet, exercise, smoking and alcohol use. At the centre of this spectrum is health communication which predominantly occurs in the form of verbal or written information. For effective communication, pharmacists need to communicate in a manner that allows easy comprehension by all patients (30).

The South African Pharmacy Council (SAPC), which is the national pharmacy regulatory body, describes the pharmacy profession as a dynamic, information-driven, patient-oriented profession aiming to fulfil the healthcare needs of South African citizens (31). Typical daily tasks of a pharmacist in South Africa who works in a patient setting and interacts with patients would typically include medication dispensing, stock control, extemporaneous compounding, cytotoxic and other sterile admixture services, ward rounds, patient education and counselling, as well as training of HCPs and medication and safety monitoring (medication error and pharmacovigilance systems) (32).

The SAPC has developed good pharmacy practice guidelines which inform the scope of practice to ensure that pharmacists' responsibilities are met (32). The scope of practice guidelines linked to this study include: "*Provision of pharmaceutical care by taking responsibilities for the patient's medicine-related needs and being accountable for meeting these needs, which shall include but are not limited to the following functions:… furnishing of information and advice to any person concerning the use of medicine; determining patient compliance with the therapy and follow-up to ensure that the patient's medicine-related needs are met;…"* (33).

**2.2 Pharmacists' extended roles in High income and Low-to-Middle income countries**

In HICs, extended pharmacists' roles are well established. In the United States, United Kingdom, Canada, Australia and New Zealand pharmaceutical care has long been established in the pharmacy profession, with notable positive outcomes being produced in both hospital and community settings in these countries. Extensive education and training of pharmacists has led to the production of pharmacists who can provide high-quality pharmaceutical care, integrating pharmacists as vital members of the healthcare team. Physicians and other HCPs acceptance of pharmacists' extended roles has led to significant positive outcomes in patient care in developed countries (34).

Pharmacists' roles in LMICs have expanded to provide a variety of services such as pharmacovigilance activities, pharmacist prescribing, disease state management, medication reconciliation (both inpatient and outpatient), discharge management and counselling, and home and residential aged care medication reviews. Pharmacists are found in general practices

and in pharmacist-led clinics (34). Physicians and the public have highly valued the expansion of pharmacist services. Extended pharmacist roles in LMICs have demonstrated benefits such as improved clinical and therapeutic outcomes and reduced healthcare costs (34).

In LMICs such as South Africa (32), the pharmacy profession has the status of an emerging profession. Services such as drug manufacturing, medicines procurement, drug dispensing and drug supply chain and storage are typically limited to pharmacists in LMICs (32,34). Within the pharmaceutical industry in LMICs, pharmacists are well remunerated for their role within the pharmaceutical industry and there is a strong demand for employment in the pharmaceutical industry field. However, pharmaceutical care services, clinical roles or pharmacy practice are primarily not yet well recognised as a critical role for pharmacists (34). In LMICs, not many pharmacists are actively involved in providing patient care-related services such as infection control, immunization, diabetes, lipid management, coronary heart disease, skin cancer prevention, mental health, sexual health, prevention of substance abuse, smoking cessation, nutrition and physical activity. Physicians' lack of acceptance of expanded pharmacists' roles in LMICs plays a role in the minimal involvement of pharmacists in providing patient care-related services (35,36). At the same time, there is also a limited professional involvement in initiatives linked to rational medicine use. Pharmacists in LMICs are underutilized, their education and training under-recognised, and their potential roles in patient care can be seen as a missed chance for optimising the health of the population (32,34).

### 2.3 Advances in pharmacy practice to incorporate patient-centred care

The shift from dispensing and technical duties to a particular focus on services that improve patient outcomes has been discussed for many years, and few programs have been fully successful or sustainable over a long period. To get a better understanding of the lack of advancement in pharmacy practice, researchers have generally focused on barriers to practice; these include pharmacists' time constraints, limited remuneration models, patient apathy and limited support from physicians and other pharmacists (37). Efforts to remove these barriers have not led to sustained practice change which has resulted in some researchers questioning whether the classic barriers to practice change are a convenient script when the actual barrier is 'pharmacists' psyche and culture'. Rosenthal (37) identifies five personality traits that are part of the pharmacy culture, which hold back pharmacists from adopting new roles. These

include lack of confidence, fear of new responsibilities, paralysis in the face of ambiguity, need for approval, and risk aversion (37).

While the practice of pharmacy employs medications as its primary means of healthcare intervention, the professional and ethical responsibilities of the pharmacist are more holistic, with pharmacists being required to take responsibility for patient-centred practice. Over the recent few years, the use of 'person-centred' as opposed to 'patient-centred' care has been preferred as it embraces more than a person's medical or clinical needs and preferences (38). In the research presented in this thesis, patient-centred and person-centred care will be used interchangeably. The Health Foundation states, "… *person-centred care incorporates use of clinical skills, evidence-based knowledge and patient perspective to provide personalised, co-ordinated care which enables people to make the most of their lives*" (39). In other terms, person/patient-centred care can be described as, "… *providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions*"(38).

Patient-centred care is a relationship in which the pharmacist and patient work together to understand what is essential to the person, make decisions about their care and treatment, and identify and achieve personal goals. Individuals who have more knowledge, skills, and confidence to manage their health and healthcare are far more likely to engage in positive health behaviours and to have better health outcomes. The current paternalistic model of care which healthcare delivers tends to foster demand, rather than encouraging self-reliance. Rather than treating patients as passive recipients of medical care, it is much more appropriate to view them as partners - in other words 'equals with different expertise' (2).

When implemented, patient-centred pharmacy is beneficial to healthcare consumers (40); for example, the implementation of patient-centred pharmacy in the United States had an impact on improved cardiovascular and overall health of Americans (41). In the United Kingdom, the government's goal of ensuring patients are actively involved in their care, with the concept of shared decision-making at the centre of the national health services, and placing patient's needs at the centre of any intervention, has informed the implementation of patient-centred practice by pharmacists (42).

In a commentary paper, Berger (43) highlights the inadequacies in pharmacy training school. Students are taught in a manner that leads to paternalistic model care where patients are told what to do, and failure is attributed to the patient's actions, rather than the pharmacist. A more effective model is the patient-centred model, where patients are also experts (43). Research supports the idea of pharmacists moving beyond the traditional role of selling and dispensing medications and becoming effective providers of patient-centred care services (40).

In South Africa there is no legislative guidance enabling collaborative practice where pharmacists can continue management of a patient's medicine therapy after initial diagnosis and prescription by a medical practitioner (32). In a commentary paper by Dowse (44), she reflects on patient-centred pharmacy in South Africa, highlights its lack in the hospital setting, and advocates closer attention to patient-centred care in pharmacy (44). Presently, South Africa is moving towards universal healthcare which will provide pharmacists with the opportunity to play a vital role in managing system and policy development to ensure the provision of adequate patient care (32). Drivers of the change to patient-centred pharmacy include government policies and regulations, which should include more explicit roles for pharmacists and the type of services offered. In addition to this any future change in policies in terms of community pharmacists should take into consideration the business and profitability of the community pharmacist (40).

Barriers to implementing patient-centred pharmacy include lack of financial motivation for pharmacists to take the time to review and track medications with all patients while also working towards optimal medication therapy (40,45), and lack of technology to enhance communication (45). An additional barrier is the refusal of physicians to acknowledge pharmacists as joint caregivers and embrace the opportunity to concentrate on other aspects of clinical delivery rather than viewing the expanded role of pharmacists as a potential threat (45).

### 2.4 Pharmacist-patient communication

In accordance with new patient-oriented roles, pharmacists are required to develop and apply appropriate communication skills (3). The pharmacist-patient communication process is described as a 'first acquaintance' moment where the pharmacist should investigate a number of issues. These include:

- Perceiving if cultural differences exist in terms of the conceptualization of 'health' and 'illness'
- Perceiving the level of knowledge the patient has regarding their health problem
- Interpreting the individual's psychological characteristics, additionally their motivations and objectives (38).

Hence the pharmacist must distinguish which patients have a sufficient level of medical-scientific knowledge and which patients do not. This aspect is crucial in terms of the pharmacist's use of medical terminology, which needs to be expressed in a simple, accessible and confidential manner. For a more effective consultancy process, the patient needs to be identified as active and the message personalised depending on sex, age and social background (38).

A fundamental element to ensure the success of pharmacist-patient communication is the quality of that communication process. Improper and inaccurate communication, together with low patient health literacy issues can easily result in misunderstanding of medical recommendations, deviation from prescribed treatment regimens, and potential inappropriate medication use (38). Researchers have noted the importance of linking together the elements of understanding, recall, satisfaction, and adherence in order to engage in high quality HCP-patient communication (3,46). Poor quality communication can result in four main consequences. First, overload or over-complexity of information, where the patient is unable to understand or forgets information received and is hesitant to raise clarifying questions (3). Second, relational shortcomings where the patient is unhappy with the advice and/or information received (3). Third, loss of patient satisfaction and adherence to prescribed regimen due to an overload of information and relational shortcomings (3), and fourth, neglect of the patient's psychological needs (3,38).

Ineffective communication can not only affect the patient, but also the pharmacist, who could face negative consequences such as a loss of customers and a decline in business. Skilled communication means effective communication, with beneficial results to both patients and pharmacists. The pharmacist is likely to experience personal satisfaction and self-esteem, while in terms of community pharmacists there could be a more engaged, loyal clientele which then offers a commercial advantage to the business (38).

### 2.4.1 Communication and health literacy

Within communication, health literacy of a patient is very important. Health literacy refers to the personal, cognitive and social skills that determine the ability of an individual to obtain, understand and use basic health information, and all services aimed at promoting and maintaining a healthy lifestyle (38). Health literacy strengthens active citizenship for health through understanding people's rights as patients and their ability to navigate through the healthcare system. It also speaks to acting individually or collectively to enhance health through the political system by voting, advocacy or membership of social movements (47). Health literacy is not just crucial for self-management, but also applies to a range of other health matters including prevention, screening, patient history taking and explanation of diagnosis (48). The crucial goal of health literacy is the enhancement of patient health (49).

Literacy is closely linked to the development of health literacy and can be used as an indicator of health literacy. However, literacy and health literacy describe different skills and are thus not identical (50). Actual health literacy can be significantly worse than general literacy, as it is more context-specific. Individuals can often read and understand general material reflecting a familiar context; however, in many cases, health information has medical terminology and vocabulary that is unfamiliar (48). Hence the pharmacist should be able to provide advice aimed at improving peoples' access to health information as well as improving their ability to use it in the most effective way (38).

Preliminary health literacy data reveal a high incidence of inadequate health literacy in the South African population (8). Considering that patients with lower health literacy are more likely to misunderstand the instructions provided on the label of a drug compared to those with marginal or adequate health literacy, many people in South Africa are likely to have levels of health literacy below those necessary for the correct and effective understanding of information related to the drug (38).

### 2.4.2 Verbal and written communication

Most HCPs employ verbal and written modes of communication with patients and other practitioners (3). Verbal communication is considered the most commonly used form of communication with patients, with essential verbal communication skills consisting of the ability to listen, understand and respond to what people say, and the ability to interpret

nonverbal communication and respond in a way that promotes continued interaction with the patient (51). Even though verbal communication is the mode most commonly employed by HCPs, there are associated problems. It is reported that 40-80% of medical information offered verbally by HCPs is immediately forgotten by patients, with the more information presented, the lower the proportion correctly recalled. In addition, roughly half the information remembered is incorrect (52). The retention rate is even lower for low health literacy patients (4). Although verbal communication is the most interactive, meaningful way of communicating, patients do not retain much information, and reinforcement with written communication is needed to accompany verbal communication (52).

The other most frequently used form of communication is written information such as patient information leaflets, medication labels, pamphlets, posters, and booklets. Written communication has its advantages, such as its medico-legal value and, with the development of online access, it is a more immediate source of information (53). However, any written health- or medicine-related information demands basic literacy skills and adequate health literacy (54) in order to optimise positive health outcomes. Misunderstanding of these health materials can result in adverse health outcomes and, parallel to this, an increase in the expense of treating such patients. Patients with low literacy place strain on the healthcare system as they tend to lack a good understanding of their disease, do not implement preventative measures, lack the insight to spot complications that may arise or have the ability to identify early symptoms resulting in their not seeking medical help timeously (55).

Literacy levels around the world remain low (56). The United Nations Educational, Scientific and Cultural Organisation (UNESCO) Institute for Statistics (UIS) in 2018 reported that an estimated 772 million adults aged 15 and above, worldwide, were illiterate, meaning they are unable to read, write or use numbers effectively to function in society (57). The global literacy rate for adults aged 15 and above is 86.3% (57), and the literacy rate in LMICs is 77.24% (57). Africa holds the highest rates of illiteracy, with more than three-quarters of the adult population having an illiteracy rate higher than 50% (58). Sub-Saharan Africa has been highlighted as one of three regions with the lowest literacy rates, with a literacy rate of 65.8% (57). Current South African literacy figures indicate that the youth literacy rate (people aged 15-34) is currently at 93.9% while the adult literacy rate (people aged 35-64) is currently at 79.3% (59). These grim literacy figures highlight the potential problem that written communication presents not only

around the world but more specifically in the South African population as low literate individuals have a higher probability of having difficulty reading and understanding vital written information (55) which could result in deteriorating health and an increase in hospital admissions.

Written medicine information should be user-friendly, appropriate for the target population and should be available in the reader's first language for effective communication (54). Written medicine information should not be the sole means of communicating health information to patients; instead, written medicine information should be used in conjunction with verbal communication (60–62).

### 2.4.3 Barriers to communication

For effective healthcare, the communication of accurate health information is crucial. However, numerous barriers can impact negatively on HCP-patient communication. Countries are no longer populated with monocultural, monolinguistic populations having similar characteristics such as levels of education and literacy. Patients, in particular minorities, refugees, immigrants, limited literacy individuals or seniors, often face problems with comprehending health information, especially if it is only available in English (30).

A majority of health education information provided to patients, both verbally and written, is presented in a manner too complex for the average patient to understand. Research has established that current written medicines information does not fulfil patient needs, with readability, availability and usefulness raised as concerns (63,64). Readability of written medicine information has been consistently reported to be significantly higher than the reading comprehension level of most patients, leading to patients perceiving the content to be too technical and complex (64). Non-adherence is one of the results of this communication mismatch. HCPs often overestimate patients' health literacy levels and rarely consider limited health literacy skills in their assessment of whether patients understand what action is needed.

Patients at all health literacy levels have problems understanding medical information, while individuals with low health literacy skills are at an even greater risk of not understanding verbal and oral communication. A substantial gap exists between the words and language used among HCPs and those of patients. Most individuals, including highly health literate patients, have

trouble understanding commonly used health terms, such as medical words, concept words, category words and value judgement words. When visual aids such as pharmaceutical pictograms are used to enhance written or spoken word, this can result in written health information becoming more understandable (65).

The 2012/13 edition of the South African Health Review (66) suggested that language remains an overlooked barrier to providing equitable and quality healthcare. South Africa is a multi-cultural and multilingual society with 44 living languages (11 have official status), and home to a large number of African refugees (30,32). The Greenberg's language diversity index which measures the probability of two people meeting at random and sharing the same mother tongue, ranked South Africa the 18$^{th}$ highest country worldwide, meaning the probability of two individuals meeting at random and sharing the same mother tongue is slim (67). IsiZulu is the most common language in South Africa (25.2%), while 13.8% of the population speak isiXhosa, the second most spoken home language. Even though only 8.1% of the population speak English as their home language (7) it is typically the preferred language of HCPs, resulting in more than 80% of medical interactions occurring across language and cultural barriers (67). The use of formally trained interpreters has been recommended to overcome the language barrier by allowing patients to express themselves in their mother tongue freely (55).

### 2.4.4 Effect of COVID-19 on communication

Preliminary research indicates that a consequence of the COVID-19 epidemic is the change in communication between patients and HCPs. Due to government guidelines of social distancing and advising vulnerable people with health issues to stay at home, there is less direct contact between patients and HCPs. Most pharmacies adopted additional hygiene measures and logistic changes aimed at minimizing the duration of patient encounters. To compensate for the reduction of counselling in the pharmacy, many pharmacists directed patients to online information materials, such as animated videos. Although these materials are a form of communication, most of the time they are not suitable as the only means of communication (68).

## 2.5 Pictograms as a communication tool in health

Visuals have been used as a means of communication throughout human history, from early caveman up to and including modern man (69). Today, in our visually saturated world, visuals are incorporated into most aspects of our daily lives to inform, warn, encourage, instruct, educate and entertain (69) either as a substitute for, or in addition to, written or oral language (69). Visuals such as drawings and symbols have the potential to be more persuasive than written information and can potentially improve written and verbal language (70). Literature has shown that pictures are easily stored and recovered from short-term memory, and this can be especially important to individuals who have poor reading skills and low education (69,71).

A pictogram is defined as "*a stylised figurative drawing that is used to convey information of an analogical or figurative nature directly to indicate an object or to express an idea*" (4). Pictograms are graphically drawn realistically hence making it easy for the observer to link them to an instruction, object, place, event, activity, or emotion. For pictograms to be successful, they do not have to be art masterpieces; they can be merely doodles and simple sketches.

The United States Pharmacopeial Convention (USPC) defines 'pharmaceutical pictograms' as "*standardised graphic images that help convey medication instructions, precautions and/or warnings to patients and consumers*" (72). Their use in pharmacy has received increasing attention over the years, possibly due to enhanced awareness of special needs patients who have limited literacy, visual impairment, or are elderly (69). The WHO states that medicine-taking behaviour is multi-factorial, complex and hinges on a dynamic interaction of several factors; the basic necessity for a patient to take medicine appropriately is for them to understand the medication instructions and be able to recall them (73). Many of these special needs patients are likely to have difficulty reading and applying written medication information.

Pharmaceutical pictograms which are correctly understood and interpreted have the potential to lower the risk of inadequate comprehension of healthcare information and can improve comprehension among patients across all literacy levels and cultures (69). Studies show that combining pictogram use with verbal communication is the most effective method in ensuring comprehension of a message (4). This advantage extends to more literate patients who also appreciate the presence of pictograms in health information as they enhance the appeal and

attractiveness of the message, thereby increasing the chances of patients engaging with and more carefully reading the text. Pictograms can also reduce repetition and information redundancy found in written information (74).

Limited literacy patients tend to be erratic in the way they read written information, often not starting at the beginning of the document. The strategic insertion of pictograms in the text has the potential to improve the organisation of content in medicine information text, making it easier to navigate and simplifying the textual information (74).

For individuals to successfully interpret pictograms, they need to possess a degree of visual literacy (75) which refers to the ability to understand, create and use visual symbols for thinking, learning and communicating, and on learning the conventions of representing three-dimensional reality on a two-dimensional surface (76,77). Visual literacy is often ignored in a formal school curriculum and is usually obtained through repetitive exposure to pictorial material and the mass media. Most individuals begin adopting this skill at a young age, e.g. when parents read to a child and explain the meaning of pictures. In many communities, however, books are rare, and the exposure to pictorial material is limited, resulting in relevant visual learning skills not being acquired and providing a roadblock to this informal learning process. The direct result of this is a poorly developed ability to interpret pictorial conventions and visual media. Visual literacy skills are enhanced as years of acquired formal schooling increases, although this is not always consistent across educational groups (75).

Low visual literacy individuals often encounter many more challenges when interpreting visual media as they are generally much slower to interpret perceptual information and often interpret visual images literally. When the message is not rapidly understood, low visual literacy individuals lose interest quickly (54). In contrast, high visual literacy individuals will systematically scan visual images to find the central concept and quickly identify the main features, rapidly interpreting visual images to arrive at the meaning. The rapid infusion of digital technology has resulted in our world being visually saturated. Each day we ‘read’ hundreds of visual cues, from our cell phones to building-size print graphics, and we can process visual media at an unprecedented rate (78). The young population frequently uses computers, video games, television and the internet; hence it has been suggested that the younger population has a higher degree of visual literacy than the older population (79).

### 2.5.1 Design, interpretation and validation of pictograms

One of the significant challenges of using pictograms is the fact that they do not always convey the intended meaning. As the famous saying goes "*a picture is worth a thousand words*"; however, if we put this in terms of pictogram comprehension a better way of saying this would be "*the appropriate picture is worth a thousand words*" (72).

The process of designing all pictograms has many stages; in all stages, a pharmacist (or other HCP), graphic artist and the target population should be involved (69). The design process is a multi-stage, iterative one which needs all pictograms to be designed, tested, modified, and re-tested to the point they are easily understood and culturally appropriate for the target population. It is important to note, however, that even after re-testing and iterative modifications, there is no guarantee that individuals will understand or interpret the images correctly (69,80).

To be adopted for use, a pharmaceutical pictogram must go through a rigorous evaluation and reach a certain level of effectiveness (4). For validation, pictograms should comply with one of two international criteria: the American National Standard Institute (ANSI Z535.3) and the International Standards Organisation (ISO 3864) which state that, in a comprehension test, pictorial symbols must reach at least a level of 85% or 67% correct interpretation, respectively (69).

### 2.5.2 Evidence for the use of pictograms

The inclusion of visuals is supported by Mayer's cognitive theory of multimedia learning, with multimedia defined as the combination of text and pictures (81). The basis of the theory is the multimedia principle, which states that people learn more deeply from words and pictures than from words alone, and that pictures can also increase the speed of message and information transfer (82).

Enhanced comprehension and recall of medicine information with pictograms has been shown in several studies (83–87). When comparing recall using pictograms alone to other presentation methods, pictograms alone score lower than for plain text, and pictures with text. However, the pictorial superiority effect is evident when pictograms are used in conjunction with verbal communication (88). This suggests that pictures used alone are not sufficient for retention of

information but should preferably be used in combination with verbal and/or written medicines instructions (30,89).

Visual attention, comprehension and recall of medicine instructions are enhanced when pictograms supplement oral and written communication, with a preference for pictograms to be used with written or oral information also reported (90). Pictograms have been shown to have the potential to influence health behaviour by enhancing adherence in high risk populations and facilitating the communication of health risks and warnings (30). Pictograms are crucial to improving readability, the attractiveness of, and visual attention to, the material and have been shown to enhance patient gratification with understandability of medicine instructions.

The use of pictograms has been a controversial issue as some studies have reported no benefit with their use (91,92). Poor pictogram comprehension can be attributed to inadequate design, the complexity and legibility of the visual, and/or the challenge of designing two-dimensional static visuals that effectively communicate abstract concepts, for example, drowsiness or dizziness (30). Problems with pictogram comprehension may also arise when well designed, and well-comprehended pictograms in one specific population are used in a different part of the world or in individuals with different education or culture (30). Pictograms, even if simple, well designed and used in the original study population, have the potential to be misinterpreted (69,76) which can result in unsafe medicine-taking practices with potentially adverse health outcomes (5). Pictograms should therefore be used with caution and always be accompanied by a verbal explanation of their correct meaning (5).

Pharmaceutical pictograms could potentially play a role in facilitating pharmacist-patient communication and enhancing the medicine counselling and patient education processes. Pictograms could be used in dispensing medications, displaying information about dosages and frequency, side effects, indication and auxiliary medicine information, and instructions (93).

### 2.6 Pharmacists' opinions of using pictograms in routine practice

There is little evidence in the literature of general pharmacist opinion of incorporating pictograms in routine practice. After a rapid screen of the literature did not yield any evidence,

a systematic search process of articles was implemented to investigate this apparent gap in the literature. The aim of the review was to investigate research regarding pharmacists' opinions relating to the use of pictograms in routine practice.

Electronic databases including Scopus, Web of Science, Medline, and Google Scholar were searched in November 2020. A repeat search was conducted in July 2021 using the same search strategy. Key words and terms were identified and were incorporated into a search strategy suitable for individual databases. An example of the search strategy used for Medline, Scopus and Web of Science was: (pharmacist OR healthcare professional OR health care professional) AND (pictograms OR visuals OR pictorials OR picture OR pictograph OR cartoons OR illustrations OR graphics OR diagram OR chart OR image) AND (attitude OR perception OR opinions). Also, the bibliographies of the included studies were screened to identify additional articles. Although the primary focus was to elicit pharmacist opinions, the search was initially expanded to all HCPs to potentially increase the number of relevant articles found.

Papers that described either qualitative, quantitative, or mixed-method methodology and that described attitude or perception or opinions of HCPs on pictogram use in routine practice were included. Following removal of duplicates, titles were screened to remove those irrelevant to the review. Abstracts of the remaining articles were assessed to remove studies that were deemed inappropriate. To extract data from included articles, an extraction form specific to this study was developed. Apart from factual information such as author names, year of publication and country in which research was conducted, data extracted included aim and/or objectives, profession of participants, study design, study setting, method of data collection, attitude or perception or opinions of HCPs of pictograms.

### 2.6.1 Literature review findings

The search strategy identified 11571 articles. After screening the articles by title, 11555 were excluded, leaving a total of 16 articles for abstract review. The abstract screening process eliminated a further 9 articles, resulting in 7 full- text articles that were assessed for eligibility. Two of these articles were deemed appropriate to include.

Study designs of the two included studies were qualitative (94,95). The number of participants in these studies ranged from 18 to 29, and publication dates for both studies were in 2016. The

included studies were undertaken in Malaysia (95) and the United States of America (94). All studies were conducted in institutions, including hospitals and primary healthcare clinics. Pharmacists' perspectives of visuals were addressed in one study (94) while the other study highlighted pharmacists' opinion on visuals (95).

Shiyanbola et al. (94) showed pharmacists had a positive view on the use of pictures on prescription warning labels as it may enhance patient understanding of medication warning information and reduce the occurrence of preventable medication errors as a result of misunderstanding information. Pharmacists raised some concerns regarding the cosmetic appearance of pictures used in the study, such as the use of clearer and less confusing pictures and the use of colours to draw attention (94).

Chan et al. (95) on investigating pharmacists' perception on improving existing labels for paediatric liquid medications, highlighted that pharmacists viewed pictographs as a way to combat caregivers' difficulty in comprehending information which was fully text-based. Pictographs could be used to illustrate important information such as dosing and instructions for taking medication with or without food (95).

This review is limited by the small number of studies included. One key finding worth highlighting is that both studies revealed the positive opinions and perceptions pharmacists have towards pictorial use in routine practice. This review did not reveal any formal research investigating pharmacists' opinions, perceptions, or attitudes of routine pictogram use. However, it did describe pharmacists participating in and adopting a key role in pictogram research.

### 2.6.2 Conclusion

Pharmacists did recommend using pictograms in practice despite some concerns about their appearance. However, as this review revealed, there is currently inadequate evidence in the literature of general pharmacist opinion of incorporating pictograms in routine practice. Further research generating good quality evidence is needed to explore opinion of pharmacists more widely regarding the incorporating pictograms into routine pharmacy practice.

## 2.7 South Africa's healthcare system

The destruction of family life, vast income inequalities, and extreme violence have all taken place in South Africa's past. The troubled history of South Africa has had a pronounced effect on the health of its population and the health policies and services of the present day. The health burden in South Africa sees the collision of the epidemics of communicable and non-communicable diseases, a high burden of maternal and child disorders and deaths from injuries and violence (96). Vast income inequalities shaped by South Africa's history remains prevalent to the present day, with the wealthiest 10% of the population accounting for 51% of the income while the most impoverished 10% account for just 0.2% of the income (97). This vast income disparity is highlighted in the health profile as a majority of the disease burden is usually carried by people living in lower socio-economic conditions (98).

The health system in South Africa consists of two different sectors: the public sector and the private sector. The public sector is made up of government health facilities that provide for the lower socio-economic population while the private sector is made up of profit-oriented medical aid organisations, and caters for the wealthier population. The extensive public sector serves 84% of the population, but accounts for only 40% of the health expenditure, while the private sector, catering for 16% of the population, uses 60% of the health expenditure (99,100).

The public health sector is managed by the National Department of Health (NDoH) and nine provincial departments of health. The national department is responsible for coordination and development of health policies nationwide, while provincial departments are responsible for implementing policies and delivering health services. Health districts in each province hold the responsibility of coordinating the provision of Primary Health Clinics (PHCs) (101). Motivated by the Pholela Health Centre Model in the province of KwaZulu-Natal, PHCs originated, which later gave rise to the development of a national PHCs strategy in the 1980s (100,102). In 1994 the National Health Plan incorporated the national PHC strategy, which aimed to enhance the healthcare system through accessible community-based healthcare by establishing PHCs centres. Presently the district health system remains the vehicle responsible for the delivery of PHCs (98).

South Africa's hospital care comprises of three levels. Tertiary, secondary, and primary care facilities. These levels allow primary healthcare to be provided in clinics, while secondary and tertiary care is provided in hospitals and specialist hospitals respectively (103). The public healthcare system, which is under-resourced and overused, has received criticism as it falls short of meeting the demand for healthcare services (100). Even though the healthcare system has the three-tier hospital services, the healthcare system remains inefficient, mostly due to the inability of local clinics to handle heavy patient caseloads resulting in inconsistent healthcare services (99,104). Often praised for a good provision of healthcare services and well-maintained healthcare facilities, the overfunded private healthcare system encounters the problem of affordability and sustainability with increasing prices and a lack of uniformity between healthcare services and costs (100,104,105).

Non-governmental organisations (NGOs), faith-based organisations, community-based organisations, and other role players such as research institutions form another component of the South African healthcare system called Non-profit organisations (NPOs). NPOs are categorised under the private sector (106). NPOs play a role in supporting public healthcare institutions by forming private-public partnerships (106,107).

Despite the gross domestic product spent on healthcare being higher than the 5% recommended by the WHO (108), the healthcare system battles with a quadruple burden of diseases, and health outcomes remain substandard in comparison to similar LMICs (107). Substandard health outcomes are due to a skewed allocation of resources, weakly developed primary healthcare systems, human resource crisis and deficiencies in the management of different aspects of the healthcare system (96,98,100).

# CHAPTER 3
# METHOD: PHASE 1 QUANTITATIVE ONLINE PHARMACIST SURVEY

The purpose of this chapter is to describe the Phase 1 research design that was employed to investigate pharmacist opinions and attitudes relating to pictograms as a communication tool, routine pictogram use in pharmacy practice, and exploration of barriers and enablers to intended adoption of pictograms in practice. It provides a detailed step by step procedure as to how the study was conducted, including study design, study setting, study population, ethical considerations, data collection tools, data collection process and analysis.

## 3.1 Aim and objectives

The aim of Phase 1 was to develop a survey to investigate pharmacist awareness and opinions of the potential use of pictograms as a communication tool. The objectives to fulfil the stated aim were:

1. To determine familiarity with pictograms and their use in healthcare
2. To investigate opinions relating to using pictograms as a communication tool in healthcare.
3. To investigate attitude, subjective norm and perceived behavioural control towards pictogram use in routine pharmacy practice
4. To identify barriers and facilitators related to pictogram use in routine practice.

## 3.2 Development of pharmacist survey

The research instrument used to collect data was an online survey designed to fulfil the study objectives. As the survey was released during the COVID-19 pandemic, the intention was to create a quick, engaging, and easy to complete survey that pharmacists could complete in less than 15 minutes. To mitigate the phenomenon of survey fatigue where survey participants provide less thoughtful responses, skip questions, or exit a survey before completion (16), time taken for survey completion was considered, with the initial intention being to include a maximum of 40 questions.

A preliminary literature search revealed that no previous research had investigated pharmacist opinion, perception or attitude relating to the use of pictograms in routine practice. The development of the new survey followed an intensive, multi-stage iterative process and was informed by prior pharmacist surveys identified in the literature (109–116). Questions were also adapted from a prior survey conducted at Rhodes University that investigated pharmacy student opinion of pictograms and their usefulness (unpublished data). An initial pool of 74 items was created.

Section 1 interrogated participant demographics and variables. Section 2 relates to objective 1 with questions on familiarity with pictograms. This section included a display of 17 pictograms and their associated meaning; the pictograms were designed for patients in South Africa, depicting dosage instructions, auxiliary or additional medication information, administration of medication, storage of medication, side effects of medication, the indication of medication and tuberculosis (TB)-related pictograms (Figure 3.1). Section 3, which relates to objective 2, investigates opinions on how pictograms are used. These three sections initially consisted of 35 questions.

Objectives 3 and 4 relate to perceived pharmacist behaviour and attitudes, behavioural control, and barriers and enablers, with the TPB (as previously described in Chapter 1) adopted as the supporting theory. In Section 4, 39 questions were initially developed. However, when matching questions with TPB constructs, gaps were identified. To assist in developing questions that populated all the TPB constructs, a TPB matrix (Table 3.1) was created, and additional questions developed to ensure that all constructs were represented by a minimum of one question (109–116). Similar questions were cut to avoid repetition, which resulted in the TPB section consisting of 22 questions.

The construction, length, and wording of all the survey questions were closely scrutinised and modified by the researcher and his supervisor to ensure good readability. Question format covered a range of response options, from tickbox choices to free-response.

A study expert panel consisting of the researcher, his supervisor, five academic pharmacists and one nurse, all of whom were familiar with pictogram use, was established. All questions were interrogated by the expert panel with the following considerations: elimination of

repetitive questions, possible problems with question content resulting in participant confusion, the need to reword questions to avoid confusion or clarify a focus, and the need to ensure that questions addressing pharmacists' opinions of pictogram relating to the use of pictograms in routine practice covered all TPB constructs. During this process, the question format was often revised in an attempt to achieve an optimal response. The final survey consisted of four sections, with a total of 69 questions.

The last section in the survey was designed to recruit participants for Phase 2 and consisted of seven questions. Participants identified as pharmacists who were either using pictograms or were interested to use them were directed to this recruitment section with questions including name, cellphone number, email address and source of the pictograms currently being used.

### 3.2.1 Validity and reliability of a research tool

The validity of a research tool is the extent to which the research tool actually measures what it is designed to measure (117). With reference to a survey, validation refers to the degree to which the questions collect accurate data relevant to the study objectives. In other words, it is the extent of systematic or built-in error in a survey (118). The process of validation encompasses testing the research tool in the population for which it is to be used to ensure the responses are a genuine response of the variables (119).

Face and content validity are frequently described as translational or representational validity (120). This type of validity looks at how well the idea of a theoretical construct is represented in an operational measure (survey) (117). Face validity aims to determine questions that have the potential to be misinterpreted, not be an accurate reflection of the variable of interest and those that participants would be unable or reluctant to answer (121). Face validity is often accomplished with a semi-structured interview or informal chat, and it remains the most widely used form of validity in developing countries (117). Face validity was tested in the pilot study (see Section 3.3).

Content validity investigates the extent to which the research instrument covers all the relevant issues (121). A content-valid survey is achieved by a rational analysis of the survey questions. The research team (the researcher (SO), his supervisor (RD) and the study expert panel) audited all questions in terms of understandability of questions, interest in the survey, visual impact,

relevance to practice, time of completion, readability, comprehensiveness, and clarity. In the pilot study, participants were asked questions to elicit feedback on the understandability of questions, interest in the survey, visual impact, relevance to practice, time of completion, readability, comprehensiveness, and clarity in order to test the content validity of the survey.

The reliability of a study instrument gives us an insight as to whether it performs consistently and in a stable manner and refers to the extent that results obtained by the survey can be replicated (117). Methods for reliability testing include test-retest and internal consistency. Internal consistency is most commonly assessed using Cronbach's alpha, which makes the assumption that items measuring the same construct should correlate (122). As the survey involves Likert scales, Cronbach's alpha, which is viewed as a measure of reliability, will be used for this survey (121).

### 3.3 Pilot version of the pharmacist survey

The version for piloting consisted of four sections, as well as a short add-on section to recruit pharmacists for the follow-up phase.

***Section 1: Demographics and work history (12 questions)***

Questions collected data relating to age, highest qualification, year of registration as a pharmacist, total years of practice, current practice site, direct interaction with patients, use of an interpreter to communicate with patients, number of patients seen in a day, average literacy levels of patients, and internet connectivity at their workplace.

***Section 2: Familiarity with pictograms (10 questions)***

Questions covered experience in using or witnessing pictograms being used in pharmacy practice, knowledge and understanding of pictograms, and reaction to pictograms designed for limited literacy viewers in South Africa. Figure 3.1 shows the pictograms depicted in this section.

***Section 3: Using pictograms in practice (24 questions)***

This section used a combination of 'Yes' or 'No' and Likert scale questions. The Likert scale was on a scale of 1 to 5, with 1 being 'Strongly disagree' and 5 being 'Strongly agree'. This

section did not measure any TPB construct but was included to help the researcher better understand pharmacists' current knowledge on using pictograms in practice.

***Section 4: Attitude, intended behaviour and influencing factors relating to routine pictogram use in pharmacy (23 questions)***

Each question in this section related to one of the TPB constructs: barriers (8 questions), enablers (4 questions), attitude (3 questions), subjective normative behaviour (5 questions), perceived control behaviour (13 questions), and intention (1 question). All items in this section used a 5-point Likert, with 1 being 'Strongly disagree' and 5 being 'Strongly agree'. Table 3.1 shows the questions and their categorisation within the different TPB constructs.


Figure 3.1: Pictograms presented to pharmacists

Table 3.1: TPB matrix of questions

| Item statement | Barrier | Enabler | Attitude | Subjective normative behaviour | Perceived behaviour control | Intention |
|---|---|---|---|---|---|---|
| The extra time taken to counsel patients with pictograms would be a deterrent to their use | ■ | | | | ■ | |
| Lack of knowledge about pictograms is a deterrent to incorporating them in my practice | ■ | | | | ■ | |
| I would require training to use pictograms when counselling patients | ■ | | | | ■ | |
| Incorporating pictograms in my practice would be expensive | ■ | | | | ■ | |
| Pictograms are too open to misinterpretation for safe use in routine practice | ■ | | | | ■ | |
| Incorporating pictograms in my practice would increase my workload | ■ | | | | ■ | |
| I am not in a position to unilaterally decide whether to incorporate pictograms into my practice as that decision would have to be made by management or other senior staff | ■ | | | | ■ | |
| Personally, I think that incorporating pictograms to counsel patients would be difficult | ■ | | | | ■ | |
| Using pictograms will give my practice a relative advantage compared to pharmacies | | ■ | | | ■ | |
| Introducing pictograms at my practice could work well with the existing workflow processes and procedures | | ■ | | | ■ | |
| If I decided to include pictograms in my practice, I think my manager (or my organisation) would support the initiative | | ■ | | | ■ | |
| I am confident that I could counsel patients about their medicines using pictograms | | ■ | | | ■ | |
| Using pictograms during patient counselling would be easy at my practice site | | ■ | | | ■ | |
| Using pictograms to counsel patients will help them recall medicines information | | | ■ | | | |
| Using pictograms to counsel patients can help improve adherence | | | ■ | | | |
| I believe it is a pharmacist's professional duty to use interventions such as pictograms as a communication tool to improve patient's comprehension and recall of medicines information | | | ■ | | | |
| I would support a National Department of Health initiative for pharmacists to use pictograms | | | | ■ | | |
| I think other pharmacists would be prepared to incorporate pictograms in their everyday practice | | | | ■ | | |
| When it comes to using pictograms, I want my practice to align with the practice of most other pharmacists | | | | ■ | | |
| When it comes to using pictograms, I will support whatever decision my manager (or my organisation) makes | | | | ■ | | |
| If the South African Pharmacy Council recommended the use of pictograms in practice I would be more inclined to incorporate them into my practice | | | | ■ | | |
| I hope to incorporate pictograms into my practice within the next year | | | | | | ■ |

### 3.4 Ethical considerations

As this study involved humans, ethical approval was required. A research proposal was submitted to the Higher Degree Advisory Committee of the Rhodes University Faculty of Pharmacy for approval. Following approval from this committee, an ethics application was submitted to the Rhodes University Ethical Standards Committee. Permission to conduct the study was obtained (2020-1643-4680) (Appendix A).

The following ethical principles (40) were considered throughout the study:

- Respect for persons: Participants were provided with a participant information statement that contained a consent form (Appendix B, C), and they were not coerced into participating in the study
- Beneficence: Participants were not harmed, and the benefits from participating in the research were communicated to the participants
- Justice: All participants were treated with equity and fairness during sample recruitment and study progression
- Non-maleficence: Participants were encouraged to express themselves in ways most comfortable for them. Non-infliction of harm was ensured by constantly seeking consent throughout the progression of the study.

### 3.5 Pilot study

In research of this sort, a pilot study is used to evaluate feasibility in the designated practice setting in terms of the study procedure and data collection, acceptability to participants of the study, and to explore whether the study procedures gather reliable and valid data effectively and efficiently (123). The objective of the pilot study was to assess face and content validity of the questions, the user-friendliness of the online survey, time of completion, and to elicit feedback on any further issues.

### 3.5.1 Pilot study setting, participants and recruitment

A short question guide (Appendix D) was developed for the pilot study to investigate participants' opinions on the usability and clarity of the survey, and to gain preliminary insight into opinions relating to the importance of the research topic.

The pilot study was conducted in Makhanda-Grahamstown, South Africa. Convenience sampling was used to recruit seven academic pharmacy interns who had completed/were in the process of completing the requisite 400 hours of practice in either a hospital or community pharmacy setting as required by the SAPC. These participants were recruited either telephonically or via personal communication. One older participant, a retired 82-year-old pharmacy lecturer who had remained active in the Faculty of Pharmacy, was included to offer insight into any potential issues that could possibly pose a problem to older participants. During recruitment, the researcher briefly explained why the research was being conducted and what was required from participants. If participants agreed to participate, the researcher organised individual face-to-face interviews which were conducted at a suitable venue in the Faculty of Pharmacy at Rhodes University.

### 3.5.2 Pilot study interviews

Due to the current COVID-19 pandemic, the pilot study adhered to strict safety guidelines of Rhodes University and NDoH. All the windows in the venue were opened to allow fresh air to circulate and to maintain good ventilation. All desks, chairs, pens, and laptop were sanitized after each participant session. A minimum distance of two metres was maintained between the researcher and the participants. Wearing of face masks was mandatory to be allowed to enter the venue, participants' skin temperatures were checked as they entered the venue. Participants were required to sanitize their hands with the hand sanitiser (which contained 70% alcohol) that was provided to them before completing the Rhodes University daily self-screening form (Appendix E).

Individual interviews were conducted in October 2020. After completion of the self-screening form, participants were asked to read the participant information statement and the consent form and to sign the consent form if they agreed to participate in the study. Permission to audio-record during the interview was obtained.

Participants were given the option to either complete the online survey using their handheld devices (e.g. cellphones) or the laptop that was available. During this process, the researcher observed participants as they worked through the online survey and made a note of any apparent difficulties or delays encountered. Upon completion of the online survey, participants were interviewed by the researcher using the short question guide.

All sessions were audio-recorded. Feedback obtained from the pilot study was used to implement changes to the survey questions to improve their clarity and to ensure that the process was a seamless one for participants.

### 3.5.3 Pilot study results

The age of the pharmacy interns ranged from 23-28 years, with the 82-year-old as an older participant. Feedback regarding the survey was overwhelmingly positive**.** All participants reported that understandability of questions was good, the survey was clear and all aspects of the topic had been covered. It was found to be interesting, "I enjoyed answering the survey, I really enjoyed it. It was clear and straight to the point" [P08].

Visual impact was considered to be very good, "The font size and spacing is well done, and the appearance of the whole survey is perfect" [P07]. "It's okay, I was able to see everything, and the font size is big enough" [P05]. However, one participant reported that the visual impact could be improved, "The colour was not appealing at all, it needs to be more colourful" [P03]. All participants considered the topic to be highly relevant to pharmacy practice, "Very relevant, I think it will bring a new approach to how we conduct ourselves as pharmacists" [P06].

Time taken to complete the survey was acceptable by participants and ranged from 16 minutes to 36 minutes, with the average time of completion being 22 ± 7 minutes, which was considered acceptable. "It would not take the whole day or an hour, probably just 30 minutes which isn't a lot and they [pharmacists] will probably go faster" [P02]. The intention had been to enable completion within 15 minutes; however, the longer time taken in this pilot study can be attributed to the specific request of the researcher to critically appraise all aspects of the survey as the participants moved from section to section.

### 3.6 Modification of survey questions

**Question 3**

**Pilot**: Gender

| Female | Male |
|---|---|

Gender choices of male or female were originally offered; it was suggested that a third option of "other" should be included. This was implemented.

**Question 9**

**Pilot**: Do you communicate directly with patients at your current practice site?

| No | Yes |
|---|---|

Choices of yes or no were offered; it was suggested that a third option of "N/A" should be included. This was implemented.

**Question 10**

**Pilot**: Do you use an interpreter to communicate with patients at your current practice site?

| Yes | No |
|---|---|

Choices of yes or no were offered; it was suggested that a third option of "N/A" should be included. This was implemented.

**Question 12**

**Pilot**: At your current practice site, how would you rate the AVERAGE LITERACY LEVEL of your patients?

| Poor | Moderate | Good | Excellent |
|---|---|---|---|

Choices of poor, moderate, good or excellent were offered; it was suggested that a fifth option of "N/A" should be included. This was implemented.

**Question 19**

**Pilot**: How many of these pictograms are easy for you to understand?

| All | Most | Only some |
|---|---|---|

It was suggested that this question be moved to after the definition of pictograms. This was implemented.

**Question 48**

**Pilot**: The extra time taken to counsel patients with pictograms would be a deterrent to their use.

It was suggested to change the term "deterrent". This was implemented by replacing it with "obstacle".

Modifications to the survey were implemented following the pilot study. All changes were done online on the Google form document. On completion, a link containing the final version of the survey was automatically generated. The final survey consisted of 70 questions, and the brief add-on survey contained seven questions (Appendix F).

### 3.7 Sample size calculation

If a 5% margin of error and a 95% confidence interval is applied for the current study, a minimum of 370 participants would be needed (124). A previous national survey of pharmacists conducted in 2016 achieved a response of 439 pharmacists. Based on this, a response of between 400-500 pharmacists was anticipated.

### 3.8 Distribution of online survey

A letter was emailed to the SAPC requesting access to the email list of all registered pharmacists. The SAPC approved the request with a number of stipulations (Appendix G).

A mailing list of these pharmacists was created using the Excel spreadsheet received from the SAPC in order to contact all registered pharmacists. The Rhodes University Information Technology department assisted in creating the mailing list.

The email to the pharmacists requesting their participation contained a summary of the project, an assurance of confidentiality and a link to access the survey (Appendix H). Clicking on the designated link directed pharmacists to the survey, where participants read a brief statement (Appendix I) introducing them to the survey. An informed consent section required completing before the survey was initiated.

The first distribution of the survey was done by email on 20 November 2020. Approximately 15,924 emails were sent, while approximately 15,637 emails were received by pharmacists. This was due to many incorrect email addresses and in some cases deceased pharmacists who were still registered with the SAPC.

One reminder email (Appendix J) to request the completion of the survey was sent after four weeks (9 December 2020). Personal emails sent to me by participants, together with comments seen on a South African pharmacy Facebook group, indicated that there were issues affecting participation, therefore the follow-up email was slightly modified. Two issues that appeared to have influenced participation were, firstly, pharmacists who do not consult directly with patients declining to participate as they felt their opinion would not be valuable and, secondly, pharmacists who were not familiar with the concept of pictograms. In the follow-up email, these two issues were addressed by highlighting that the opinion of all pharmacists, including those that do not consult with patients, would be valued. In addition, a brief explanation of pictograms and the pictogram research that has been conducted at Rhodes was included. A link to a commentary paper by RD (30) which addresses the topic of pictograms as a valuable communication tool was also included to offer pharmacists more information regarding pictograms.

The link for the survey was accessible for three months (20 November 2020 – 20 February 2021). An additional email was sent on 10 February 2021 to Rhodes University pharmacy alumni requesting their participation in an attempt to optimise recruitment (Appendix K). All information remained confidential throughout the process.

### 3.9 Analysis of data

All responses were automatically captured on a Google form spreadsheet and converted to numerical responses on Microsoft Excel. Frequency data, as well as mean and standard deviation data, were generated for survey results. Pearson correlation was used to investigate correlations between participant characteristics and familiarity with pictograms and use of pictograms in practice. The level of significance was set as $p < 0.05$. To test the internal consistency of the survey, Cronbach's alpha was used.

Before commencing with Structural Equation Modelling (SEM), the Kaiser-Meyer-Oklin (KMO) test was conducted. This test is used to verify sampling adequacy. Additionally, the Bartlett's test for correlation matrix (a matrix of values that shows the correlation coefficients between variables) was conducted to test that the correlation matrix of the variables in our dataset diverges significantly from the identity matrix (a matrix in which all of the values along the diagonal are 1 and all of the other values are 0), indicating an SEM analysis would compress variables into linear combinations that are able to capture significant variance in the data. An acceptable KMO limit was established at 0.5 or above, while the Bartlett test should be significant, with a $p < 0.05$ (125).

SEM analysis was used to examine the TPB constructs and determine if there is a significant relationship between the constructs of attitude, subjective norm and perceived behavioural control with intention to use pictograms. SEM is a group of statistical techniques that can be considered an extension of multiple regression. Researchers frequently use multiple regression to analyse TPB constructs. With multiple regression, the influence of several independent variables on one dependent variable can be investigated; however, a detrimental effect of this is that all the variables result in imperfect measures, leading to problems of interpretation. In cases where a multiple regression analysis highlights a certain level of correlation between an independent variable and dependent variables, it is difficult to determine to what level the observed correlation has been reduced by poor measurement of the variables in the analysis (126).

SEM, on the other hand, allows the investigation of how well individual variables are measured, at the same time as investigating the extent to which variables are related to each other. This circumvents the problems of interpretation encountered in multiple regression. SEM can do this by using latent variables (e.g. factors in factor analysis) in analyses similar to regression analyses (126). Hence it was determined that SEM rather than multiple regression would be appropriate to conduct analyses of the TPB constructs in this study.

Each latent variable is created when a researcher specifies which observed variables are measuring a construct. The particular SEM program would then calculate how well the variables are measuring the construct. SEM analysis was conducted using R (x64 4.0.2). The R package Lavaan which was developed to provide researchers with a free, fully open-source,

but commercial-quality package for latent modelling, was downloaded into R to allow analysis. (127). Questions 48 - 60 in the survey measured the latent variable ‘perceived behavioural control’, questions 61 - 63 measured the latent variable ‘attitude’, and questions 64 - 68 measured the latent variable ‘subjective norm’.

# CHAPTER 4
# RESULTS: PHASE 1 PHARMACIST SURVEY

This chapter reports findings from the quantitative Phase 1 survey of the study. Results from the survey assessing pharmacist familiarity with pictograms, opinions relating to pictograms in healthcare and the attitude, subjective norm, intention and perceived behavioural control of pharmacists towards pictogram use in routine pharmacy practice are presented. Significant associations and correlations with TPB constructs are described.

## 4.1 Demographics and personal information

A total of 426 pharmacists completed the survey during the three-month access period. The minimum number of respondents needed for this study had been proposed as 400. The characteristics of the pharmacist participants are shown in Table 4.1

Just over a third were less than 35 years of age (34%), and the mean age was 43.5 ± 14.1. Female pharmacists represented 74.2% of the sample, while 25.8% were male pharmacists. Most pharmacists' highest qualification was a Bachelor of Pharmacy degree (64.3%), with their mean total years of practice being 18.6 ± 13.7. Regarding current practice site, 27% of pharmacists worked at either a private or corporate community pharmacy, and 24% at either a hospital or a primary care clinic. Other places of work included national or provincial department of health, South African Health Products Regulatory Authority and non-governmental organisations, researchers, consultants, academics or offer specialist pharmacy services. Most pharmacists (66.2%) reported having direct communication with patients, and 17.1% used an interpreter to communicate with patients. The number of patients that pharmacists reported interacting with daily was spread fairly evenly between a low of less than 20 to a high of over 100. Pharmacists' opinion of the average health literacy of their patients was that 40.6% had low literacy whereas a lower 35.0% had adequate literacy. Most pharmacists (86.2%) reported having internet access in their pharmacy/organisation.

Table 4.1: Participant demographics and practice site information

| **Demographics** | **Frequency n (%)** | **Mean ± SD** |
|---|---|---|
| Age | | 43.5 ± 14.1 |
| <35 | 145 (34.0) | |
| 35 - 45 | 111 (26.0) | |
| 46 - 55 | 77 (18.0) | |
| >55 | 93 (22.0) | |
| Sex | | |
| Female | 316 (74.2) | |
| Male | 110 (25.8) | |
| Highest qualification | | |
| BPharm | 274 (64.3) | |
| Masters | 103 (24.2) | |
| PharmD | 3 (0.7) | |
| PhD | 18 (4.2) | |
| Post graduate diploma | 28 (6.6) | |
| Current practice site | | |
| Community pharmacy-private/corporate | 116 (27.0) | |
| Hospital-public/primary care clinic | 104 (24.0) | |
| Hospital-private | 35 (8.0) | |
| Medical aid/pharmaceutical industry | 69 (16.0) | |
| Other | 102 (24.0) | |
| Total years of practice (yrs) | | 18.6 ± 13.7 |
| Communicate directly with patients | | |
| Yes | 282 (66.2) | |
| Use an interpreter to communicate | | |
| Yes | 73 (17.1) | |
| Number of patients seen in a day[1] | | |
| ≤20 | 64 (15.0) | |
| 21 - 50 | 65 (15.3) | |
| 51 - 75 | 54 (12.7) | |
| 76 - 100 | 49 (11.5) | |
| >100 | 73 (17.1) | |
| Average literacy levels of patients[1] | | |
| Low literacy | 173 (40.6) | |
| Adequate literacy | 149 (35.0) | |
| Wi-Fi or other internet connection | | |
| Yes | 367 (86.2) | |

[1] *Percentage does not summate to 100 as "N/A" option omitted.*

## 4.2 Pharmacists' familiarity with pictograms

Table 4.2 presents results of pharmacists' knowledge, experience and understanding of pictograms. Results are presented as mean ± SD and frequency. The scoring of the five questions was as follows:

- Question 1: Yes = 100, Partly = 50, No = 0
- Question 2: Yes = 0, Partly = 50, No = 100
- Question 3: All = 100, Most = 50, Only some = 0
- Questions 4-5: Yes = 100, No = 0

Table 4.2: Pharmacist familiarity with pictograms, n = 426

| **Familiarity with pictograms** | **Frequency n (%)** | **Mean ± SD** |
|---|---|---|
| 1. Familiar with the word 'pictograms' as used in healthcare | | 89.0 ± 26.2 |
| Yes | 354 (83.1) | |
| No | 22 (5.2) | |
| Partly | 50 (11.7) | |
| 2. Pictograms are a universal language and can be understood by all | | 16.2 ± 27.4 |
| Yes | 305 (71.6) | |
| No | 17 (4.0) | |
| Partly | 104 (24.4) | |
| 3. Proportion of pictograms you easily understood | | 59.9 ± 32.5 |
| All | 140 (32.9) | |
| Most | 230 (54.0) | |
| Only some | 56 (13.1) | |
| 4. Observed pictograms being routinely used in a pharmacy setting | | 23.2 ± 42.3 |
| Yes | 99 (23.2) | |
| No | 327 (76.8) | |
| 5. Used pictograms in my practice | | 45.1 ± 49.9 |
| Yes | 192 (45.1) | |
| No | 234 (54.9) | |

A majority of pharmacists (83.1%) were familiar with the term 'pictograms'. However, 71.6% incorrectly regarded pictograms as representing a universal language understood by all. Pharmacists were shown pictograms (see Section 3.2) and 54% reported that most were easy to understand. Over three-quarters of pharmacists (76.8%) had never observed pictograms used routinely in a pharmacy setting. A surprising 45.1% reported that they had used pictograms for particular patients occasionally in their practice. Box 4.1 shows pharmacists' comments of how they had used pictograms in their practice.

Box 4.1: Free comments regarding how pharmacists used pictograms in their practice

| Comments |
|---|
| **Overcome communication barriers** |
| Downloaded from the internet, for patients who were from a rural setting with language barrier. |
| Not very often as most patients are counselled sufficiently verbally however drawing pictures on medicine boxes such as a sun and moon and help forgetful/illiterate patients understand what time of day they should be taking their medication |
| I have drawn circles to represent tablets and drawn them on medicine packs to indicate how many tablets and how many times a day the tablets should be taken. For example, 3 circles spaced out evenly meaning take a full tablet 3 times a day |
| I use it [pictogram] to illustrate dosages, for example, if patients have to take a quarter of a tablet I draw a circle, then draw a line in the middle, then draw another line in the middle crossing the first one and then I colour in a quarter of the circle to show them that's the part they have to take. I use it approximately once a week. |
| I have used my own drawings when communicating with deaf people, which is very seldom. Also, where the person does not understand the word I am using (also very seldom). I usually write words as well, easy to understand. |
| **How to use medication** |
| They [pictograms] have been used to explain dosage forms and how to use appliances. These are used very often, almost on the daily. |
| How to use an inhaler, suppositories, subcut [subcutaneous] injections. |
| I used pictograms in explaining eye drops. |
| Used for dermatology scripts, to explain easily to patients where on the body to apply different mixtures. |
| **Explaining health conditions** |
| Very often in explaining menstrual cycle, fertile & infertile days. Sometimes explaining difference between URT & LRT or Colon & small intestine |
| How corticosteroid with a bronchodilator work and why to be used regularly. |
| Using them [pictograms] to explain where the medication targets in the body. Or basic description of basic anatomy that relates to one's condition. |
| Use pictures fairly often to illustrate symptoms and their cause, haven't really used pictures to illustrate dosage / instructions or side-effects. |
| Explaining cd4 counts and viral loads to patients. Drawing for deaf patients to improve medication understanding. |

### 4.3 Pharmacists' opinions of pictogram design and their use in practice

To establish baseline perceptions of current medication communication practice, initial questions investigated pharmacists' opinions on currently used written medicine information. A 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used and results presented as mean ± SD. Most pharmacists did not feel that current medicine labels provide adequate information to patients (2.2 ± 1.0), and nearly all pharmacists agreed that

label information should always be reinforced verbally (4.8 ± 0.6). Regarding patient information leaflets, pharmacists expressed the opinion that most patients did not take the time to read the patient information section of a professional information leaflet (2.0 ± 1.0).

### 4.3.1 Design and usefulness of pictograms

With reference to the pictograms displayed in the survey (see Section 3.2), pharmacists were asked for their immediate instinctive reaction to these pictograms. Eight options were offered, with pharmacists being able to choose multiple options as well as having the opportunity to offer a free response. A total of 781 responses were captured, Figure 4.1 presents the percentage of the 781 responses captured. Typical examples of pharmacists' comments of design and general opinions of pictograms are shown in Box 4.2

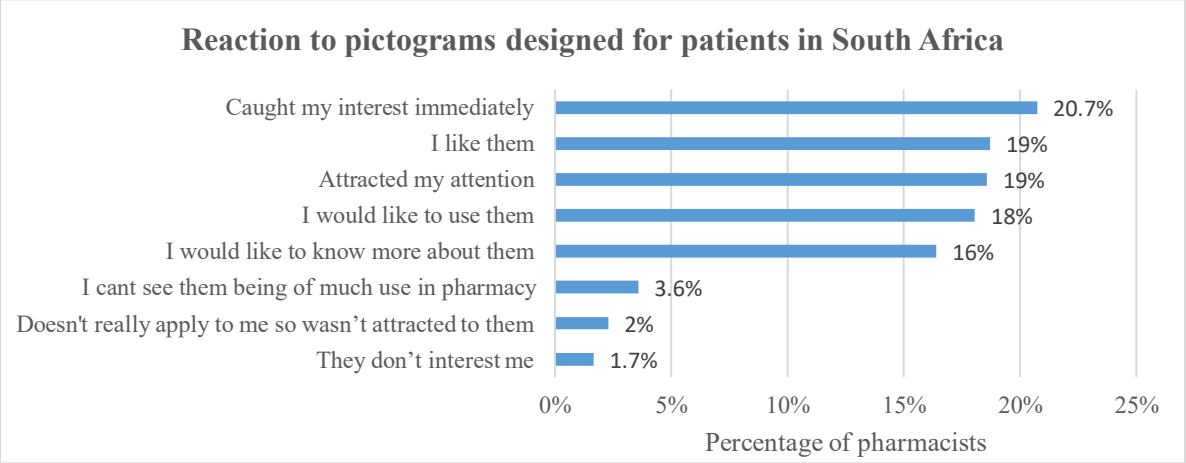


Figure 4.1: Reaction of pharmacists to locally designed pictograms

Box 4.2: Free comments regarding pictogram design and general opinions of pictograms

| **Comments** |
|---|
| **Pictogram design** |
| They [pictograms] are very relevant and clear and easy to understand. |
| Great illustrations, easy to understand. |
| The pictograms are simple yet effective. |
| The pictograms are easy to understand by someone who is not medically trained. |
| They are useful as a reminder of how the medication should be taken and route of administration as well. |
| The little bag is misleading…If I only saw the little bag with the bottles and the cross I would not understand but seeing the one getting empty for finish the course it then interprets better. |

I think there would need to be a key of words for those that can read so that the same message is passed on as the universal (or at least national) use of that picture for interpretation.

Love the ointment do not eat message / suppository and shake is excellent.

Vomiting I thought was spit after gargling perhaps.

The “take with food” one could be seen as “add to food”.

The “skin rash” looks like a hairy man.

Too small with too much information. Too bleak, short of colour.

Some of the pictograms seem a bit explicit e.g. Vomiting and diarrhoea pictograms.

Some are easy to understand some are slightly ambiguous. Like the bag with the tablets looks like a bag of chips or sweets. It is not a traditional view of tablets.

While I understand it is essential to make the patients in the pictures relatable and assumption is being made that this only applies to African communities that are illiterate.

Sometimes I feel like it's trying to add too much detail into it, and this can lead to an unclear message.

Males used mostly. Not enough children/babies used. Can easily be misinterpreted or misled.

They easy to understand and helpful to people who are illiterate

Colour and better illustrations can improve its attractiveness. Like a work of art, it should have a reason, why people keep staring at it.

**General opinion**

I can see how they will be useful in a setting where there might be a language barrier between patient and pharmacist.

The immediate meaning of most of them is lost to me. I had to figure out what was the intention of most of them.

Very helpful because most of my patients have English as second language.

Think the idea is awesome. A picture says a thousand words that even someone who can’t read can understand.

Direct and simple.

Practical, convey message but didn’t keep my attention.

These would be very nice as stickers together with dispensing label.

I am not 100% certain of all of their meanings at first glance.

I haven't used them myself, but my initial reaction is that they convey the necessary message to patients who may struggle with language or literacy barriers.

They're extremely well thought out.

Table 4.3 presents Likert scale results regarding pharmacists' opinions relating to using pictograms as a communication tool in healthcare. Results are presented as mean ± SD and mode (range). Most pharmacists thought the design and overall look of the pictograms would be easy for most patients in South Africa to understand (71.6 ± 24.0). Pharmacists believed the pictograms communicated the core message clearly (68.7 ± 24.4) and that pharmacists should

routinely use pictograms (75.2 ± 24.5). A majority (81.6 ± 20.8) felt that using pictograms with written medicine information would make it easier for patients to comprehend. The majority also felt that pictograms should be used for all patient populations (65.0 ± 30.6), whereas half were of the opinion that pictograms should only be used for certain at-risk population groups (49.6 ± 34.9).

Table 4.3: Pharmacists' opinions on using pictograms in practice

| Opinions on using pictograms in practice[1] | Mean ± SD | Mode (0,100) |
|---|---|---|
| **Design and usefulness** | | |
| The design and overall look of these pictograms would make it easy for most patients in South Africa to comprehend | 71.6 ± 24.0 | 75 (0,100) |
| The pictograms communicate the core message clearly | 68.7 ± 24.4 | 75 (0,100) |
| I believe that pharmacists should routinely use pictograms | 75.2 ± 24.5 | 100 (0,100) |
| Including pictograms with written medicines information would make it easier for patients to comprehend | 81.6 ± 20.8 | 100 (0,100) |
| I believe pictograms should be used for all patient populations | 65.0 ± 30.6 | 100 (0,100) |
| Pictograms should be used only for certain at-risk patient populations | 49.6 ± 34.9 | 25 (0,100) |
| **How pictograms should be used** | | |
| All medicine packaging should include pictogram content | 67.7 ± 26.4 | 75 (0,100) |
| Pictograms should only appear on selected medicines | 42.8 ± 29.6 | 25 (0,100) |
| Patients would like to see pictograms being used on medicines and in information leaflets | 68.4 ± 22.7 | 75 (0,100) |
| All patients will appreciate having pictograms appear on their medicines or on patient information leaflets | 59.0 ± 27.5 | 50 (0,100) |
| Only certain patient groups are likely to appreciate having pictograms being used on medicines or on patient information leaflets | 59.6 ± 29.3 | 75 (0,100) |
| Patients would approve of pharmacists using pictograms for counselling | 74.8 ± 20.9 | 75 (0,100) |

[1]*Likert scale: Strongly agree = 100, Agree = 75, Neutral/unsure = 50, Disagree = 25, Strongly disagree = 0*

### 4.3.2 How pictograms should be used

Pharmacists felt that all medicine packaging should have pictograms (67.7 ± 26.4), and the mean of 42.8 ± 29.6 suggests pharmacists 'disagreed' that only some medicines should have pictograms. Pharmacists believed patients would like to see pictograms used on their medicines and information leaflets (68.4 ± 22.7), and that patients would approve of pharmacists using pictograms for counselling (74.8 ± 20.9). However, pharmacists felt unsure if all patients would appreciate having pictograms on their medication/patient information leaflet (59.0 ± 27.5) or if only certain patient groups would appreciate having pictograms on their medication/patient information leaflet (59.6 ± 29.3).

Pharmacists were presented with seven categories of medicine information and asked to state their opinion as to whether pictograms should be used (Figure 4.2). Most pharmacists agreed that pictograms should be used for dosage instructions (91%), auxiliary or additional information (86%), warning (96%) and storage (94%). Two-thirds of pharmacists agreed on pictogram use for indication (68%), while over a half felt that pictograms should be used for side effects (59%) and risk communication (58%). Pharmacists also suggested pictograms be used for expiry dates and disposal instructions, with the latter relating to the potential to motivate for recycling.

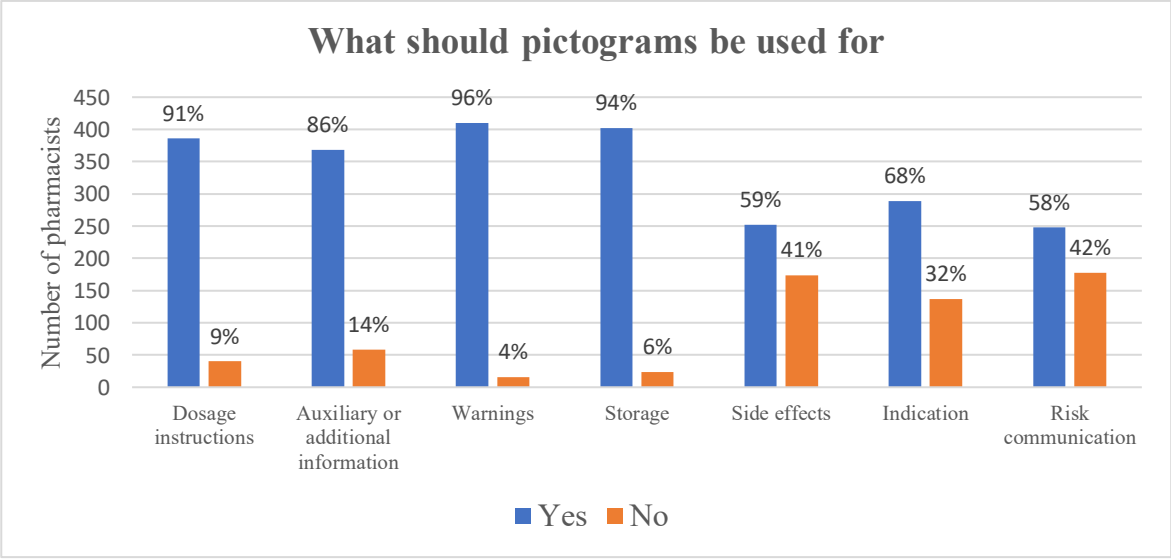


Figure 4.2: Pharmacists' opinions on the categories of medicines information for which pictograms should be used

## 4.4 Attitude, subjective norm, intention, and perceived behavioural control relating to pictogram use in routine pharmacy practice

Table 4.4 indicates the number of items and reliability of the questions in each construct of the TPB and the overall survey, with Cronbach's alpha values being greater than 0.60 (128).

Table 4.4: Cronbach's alpha and number of items from the four constructs of the TPB

| Scale[1] | Items | Cronbach's alpha |
|---|---|---|
| Attitude | 3 | 0.865 |
| Subjective norm | 5 | 0.770 |
| Perceived behavioural control | 13 | 0.794 |
| Intention | 1 | |
| Total items | 22 | 0.698 |

[1]*Likert scale: Strongly disagree = 1, Disagree = 2, Neutral/unsure = 3, Agree = 4, Strongly agree = 5*

### 4.4.1 Perceived behavioural control

Table 4.5 lists the descriptive statistics for individual TPB items, including the percentage of respondents who reported positively (either strongly agreed or agreed) and negatively (either strongly disagreed or disagreed) for each statement. Nearly two-thirds of pharmacists (62.2% - 63.3%) disagreed that extra time to counsel patients with pictograms (2.3 ± 1.1) and lack of knowledge about pictograms (2.3 ± 1.1) are barriers to using pictograms, while over half of pharmacists (51.4%) disagreed that the need for training to use pictograms (2.6 ± 1.2) served as a barrier. Less than half of pharmacists (42.1% - 44.8%) disagreed that cost (2.6 ± 1.0) and increased workload (2.7 ± 1.1) was a barrier to pictogram use.

Over one-third of pharmacists (35.4%) disagreed that pictogram misinterpretation (2.9 ± 1.1) served as a barrier, whereas nearly half of pharmacists (48.3%) indicated lack of control (3.4 ± 1.4) as a barrier to incorporate pictograms in their pharmacy. Three-quarters of pharmacists (74.6%) expressed that counselling patients with pictograms would not be difficult for them (2.1 ± 0.9).

More than half of pharmacists (57.0 % - 59.1%) believed pictogram use would give their pharmacy a relative advantage (3.7 ± 1.1), they would receive support from their manager (3.7 ± 0.9) and introducing pictograms would work well with their existing workflow processes and procedures (3.6 ± 0.9). Most pharmacists (82.6%) were confident in their ability to counsel patients about

medicines usage with pictograms (4.1 ± 0.8), with 60.8% indicating patient counselling using pictograms would be easy for them at their practice site (3.7 ± 1.0). Overall, pharmacists had a neutral perceived behavioural control towards using pictograms in routine pharmacy practice (3.0 ± 1.2), and generally, pharmacists appeared to 'disagree' with barrier statements (mode = 2 – 3) and to 'agree' with facilitator statements (mode = 3 – 4).

### 4.4.2 Attitude

Most pharmacists (83.3% - 85.9%) believed pictograms would improve patients' ability to remember medicine information (4.2 ± 0.8) and improve patients' adherence (4.2 ± 0.8). They regarded pharmacists as having a professional duty to use pictograms to improve patients' comprehension and recall of medicine information (4.2 ± 0.9). The total mean attitude score was 4.2 ± 0.9, indicating a positive attitude towards using pictograms in routine pharmacy practice.

### 4.4.3 Subjective norm

A majority of pharmacists (81%) would support a national initiative encouraging pharmacists to implement the use of pictograms in pharmacy (4.2 ± 1.0), whereas two-thirds of pharmacists (66.7%) would be more inclined to incorporate pictograms in their practice if the SAPC recommended the use of pictograms (3.8 ± 1.00). Less than two-thirds of pharmacists (59.2% - 63.7%) believe other pharmacists would be ready to incorporate pictograms (3.7 ± 1.0), want to align their practice with the practice of most other pharmacists when it comes to using pictograms (3.7 ± 1.0), and would support whatever decision their manager or organisation makes when it comes to using pictograms (3.7 ± 1.0). Overall, pharmacists had a neutral subjective norm towards using pictograms in routine pharmacy practice (3.8 ± 1.0).

### 4.4.4 Intention

Over one-third of pharmacists (36.8%) indicated they hope to incorporate pictograms into their practice within the next year, with the overall mean ± SD (3.3 ± 1.0) and mode (3) indicating a neutral intention to using pictograms in routine pharmacy practice.

Table 4.5: TPB descriptive and item statements

| Item statement[1] | Mean ± SD | Mode | Percent agreed[2] | Percent disagreed[3] |
|---|---|---|---|---|
| **Perceived behavioural control** | 3.0 ± 1.2 | | | |
| The extra time taken to counsel patients with pictograms would be an obstacle to their use | 2.3 ± 1.1 | 2 | 15.7 | 63.3 |
| My lack of knowledge about pictograms is a deterrent to incorporating them in my practice | 2.3 ± 1.1 | 2 | 15.0 | 62.2 |
| I would require training to use pictograms when counselling patients | 2.6 ± 1.2 | 2 | 29.6 | 51.4 |
| Incorporating pictograms in my practice would be expensive | 2.6 ± 1.0 | 3 | 16.7 | 42.1 |
| Pictograms are too open to misinterpretation for safe use in routine practice | 2.9 ± 1.1 | 3 | 27.7 | 35.4 |
| Incorporating pictograms in my practice would increase my workload | 2.7 ± 1.1 | 2 | 24.2 | 44.8 |
| I am not in a position to unilaterally decide whether to incorporate pictograms into my practice as that decision would have to be made by management or other senior staff | 3.4 ± 1.4 | 5 | 48.3 | 29.3 |
| Personally, I think that incorporating pictograms to counsel patients would be difficult | 2.1 ± 0.9 | 2 | 7.7 | 74.6 |
| Using pictograms will give my practice a relative advantage compared to other pharmacies | 3.7 ± 1.1 | 4 | 59.1 | 11.3 |
| Introducing pictograms could work well with existing workflow processes and procedures | 3.6 ± 0.9 | 4 | 57.8 | 10.6 |
| If I decided to include pictograms, I think my manager (or my organisation) would support the initiative | 3.7 ± 0.9 | 3 | 57.0 | 5.1 |
| I am confident that I could counsel patients about their medicines using pictograms | 4.1 ± 0.8 | 4 | 82.6 | 3.3 |
| Using pictograms during patient counselling would be easy at my practice site | 3.7 ± 1.0 | 4 | 60.8 | 9.1 |
| **Attitude** | 4.2 ± 0.9 | | | |
| Using pictograms to counsel patients will improve patients' ability to recall medicine information | 4.2 ± 0.8 | 4 | 85.9 | 3.8 |
| Using pictograms to counsel patients can help improve adherence | 4.2 ± 0.8 | 4 | 84.3 | 3.3 |
| I believe it is a pharmacist's professional duty to use interventions such as pictograms as a communication tool to improve patient's comprehension and recall of medicines information | 4.2 ± 0.9 | 5 | 83.3 | 4.9 |
| **Subjective norm** | 3.8 ± 1.0 | | | |
| I would support a National Department of Health initiative for pharmacists to use pictograms | 4.2 ± 1.0 | 5 | 81.0 | 5.4 |
| I think other pharmacists would be prepared to incorporate pictograms in their everyday practice | 3.7 ± 1.0 | 4 | 63.7 | 9.7 |
| When using pictograms, I want my practice to align with the practice of most other pharmacists | 3.7 ± 1.1 | 4 | 60.5 | 12.0 |
| When using pictograms, I will support whatever decision my manager (or my organisation) makes | 3.7 ± 1.1 | 4 | 59.2 | 13.4 |
| If the SAPC recommended the use of pictograms I would be more likely to implement them in practice | 3.8 ± 1.0 | 4 | 66.7 | 9.1 |
| **Intention** | | | | |
| I hope to incorporate pictograms into my practice within the next year | 3.3 ± 1.0 | 3 | 36.8 | 13.2 |

[1]*Likert scale: Strongly disagree = 1, Disagree = 2, Neutral/unsure = 3, Agree = 4, Strongly agree = 5*
[2]*Includes those who strongly agreed*
[3]*Includes those who strongly disagreed*

## 4.5 Correlation of selected variables with familiarity with using pictograms and using pictograms in practice

Table 4.6 presents familiarity with using pictograms and using pictograms in practice correlations with selected demographic and practice- related information. Familiarity with pictograms showed no significant correlation with the selected variables. Using pictograms in practice only showed a negative correlation with only age; the correlation was weak but significant.

Table 4.6: Correlation of selected variables with familiarity with pictograms and using pictograms in practice

| **Correlations** | **Familiarity with pictograms** | **Using pictograms in practice** |
|---|---|---|
| **Age** | | |
| Pearson correlation | -0.016 | -0.178 |
| Significance | 0.735 | 0.000* |
| **Use an interpreter to communicate** | | |
| Pearson correlation | -0.092 | -0.058 |
| Significance | 0.057 | 0.231 |
| **Number of patients seen in a day** | | |
| Pearson correlation | 0.061 | -0.002 |
| Significance | 0.211 | 0.967 |
| **Average literacy of patients** | | |
| Pearson correlation | -0.007 | -0.044 |
| Significance | 0.890 | 0.368 |

**A significant correlation at $p < 0.05$*

## 4.6 Structural equation modelling analysis

### 4.6.1 Kaiser-Meyer-Oklin and Bartlett's tests

The Bartlett's test showed a correlation between the variables ($\chi^2 = 3893.46$, df = 231) and p = < 0.00, indicating that the correlation matrix of the variables in our dataset diverge significantly from the identity matrix. The Kaiser-Meyer-Oklin test showed a measure of sampling adequacy coefficient = 0.90, verifying the sampling adequacy of the analysis. Therefore the sample is adequate, and structural equation modelling (SEM) analysis can be performed.

### 4.6.2 Theory of planned behaviour structural equation modelling analysis

Figure 4.3 illustrates the outcomes of the structured model with standardized estimate parameters (N = 426). Chi-square for this model was $\chi^2 = 3979.08$, $p < 0.000$. The fit indices indicated adequate fit (standardized root mean square residual (SRMR) = 0.08, root mean square error of

approximation (RMSEA) = 0.09, comparative fit index (CFI) = 0.80), meeting two of the three fit indices cut-offs as recommended by Hu and Bentler (129), but falling short of the recommended cut-off for the CFI (129,130).

The R-squared value indicated the percentage of the variance in 'Intention' that 'Subjective norm', 'Perceived behavioural control' and 'Attitude' explain collectively. It measures the strength of the relationship between the model and 'Intention' on a 0 – 100% scale. The model accounted for 53% of variance (R-squared value) in intentions towards using pictograms in practice (Figure 4.3). Subjective norm had a significant positive relationship with intention ($\beta = 0.57$, $p < 0.000$) and perceived behavioural control had a significant negative relationship with intention ($\beta = -0.83$, $p < 0.000$). Intention was not affected by attitude as paths from attitude ($\beta = -0.25$, $p < 0.117$) to intention were not significant. Factor loading for the model is detailed in Table 4.7. To allow for easy integration of information, acronyms such as 'PBC 1' were used instead of question numbers to label the different variables in the structural equation model.

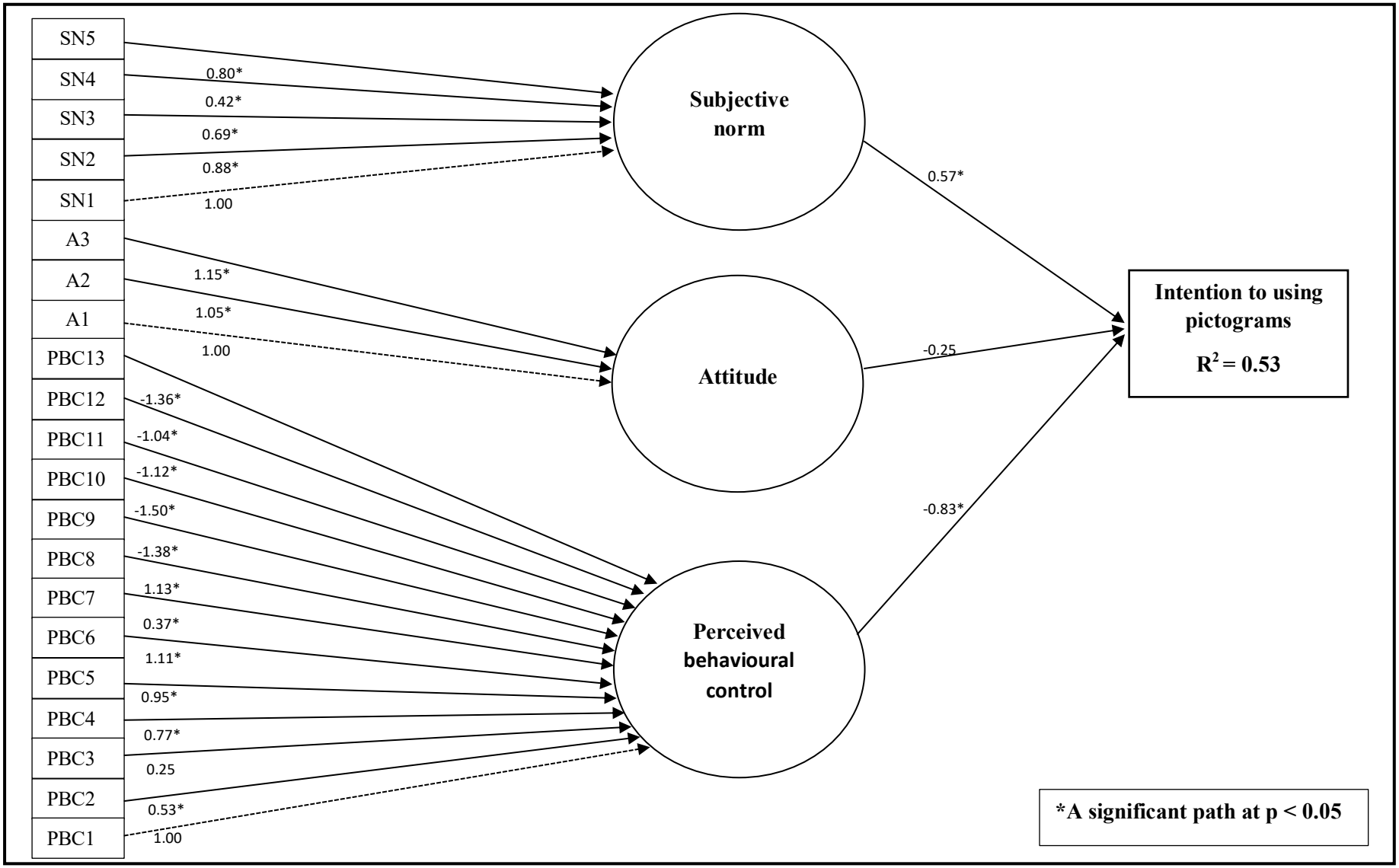


Figure 4.3: TPB SEM with standardized estimate parameter

Table 4.7: Factor loadings for the SEM model

| Variable name | Item statement | Estimate (Std. Err.) Factor Loadings | P-value |
|---|---|---|---|
| **Perceived behavioural control (PBC)** | | | |
| PBC 1 | The extra time taken to counsel patients with pictograms would be an obstacle to their use | 1.00[+] | |
| PBC 2 | My lack of knowledge about pictograms is a deterrent to incorporating them in my practice | 0.53 (0.12) | 0.000* |
| PBC 3 | I would require training to use pictograms when counselling patients | 0.25 (0.13) | 0.054 |
| PBC 4 | Incorporating pictograms in my practice would be expensive | 0.77 (0.13) | 0.000* |
| PBC 5 | Pictograms are too open to misinterpretation for safe use in routine practice | 0.95 (0.14) | 0.000* |
| PBC 6 | Incorporating pictograms in my practice would increase my workload | 1.11 (0.15) | 0.000* |
| PBC 7 | I am not in a position to unilaterally decide whether to incorporate pictograms into my practice as that decision would have to be made by management or other senior staff | 0.34 (0.15) | 0.013* |
| PBC 8 | Personally, I think that incorporating pictograms to counsel patients would be difficult | 1.14 (0.14) | 0.000* |
| PBC 9 | Using pictograms will give my practice a relative advantage compared to other pharmacies | -1.38 (0.17) | 0.000* |
| PBC 10 | Introducing pictograms could work well with existing workflow processes and procedures | -1.50 (0.17) | 0.000* |
| PBC 11 | If I decided to include pictograms, I think my manager (or my organisation) would support the initiative | -1.12 (0.14) | 0.000* |
| PBC 12 | I am confident that I could counsel patients about their medicines using pictograms | -1.04 (0.13) | 0.000* |
| PBC 13 | Using pictograms during patient counselling would be easy at my practice site | -1.36 (0.16) | 0.000* |
| **Attitude** | | | |
| A 1 | Using pictograms to counsel patients will improve patients' ability to recall medicine information | 1.00[+] | |
| A 2 | Using pictograms to counsel patients can help improve adherence | 1.05 (0.06) | 0.000* |
| A 3 | I believe it is a pharmacist's professional duty to use interventions such as pictograms as a communication tool to improve patients' comprehension and recall of medicines information | 1.15 (0.07) | 0.000* |
| **Subjective norm (SN)** | | | |
| SN 1 | I would support a National Department of Health initiative for pharmacists to use pictograms | 1.00[+] | |
| SN 2 | I think other pharmacists would be prepared to incorporate pictograms in their everyday practice | 0.89 (0.06) | 0.000* |
| SN 3 | When using pictograms, I want my practice to align with the practice of most other pharmacists | 0.69 (0.07) | 0.000* |
| SN 4 | When using pictograms, I will support whatever decision my manager (or my organisation) makes | 0.42 (0.07) | 0.000* |
| SN 5 | If the SAPC recommended the use of pictograms I would be more likely to implement them in practice | 0.80 (0.06) | 0.000* |

* $p < 0.05$

[+] *Fixed parameter*

# CHAPTER 5
# METHOD: PHASE 2 EXPLORATION OF CURRENT AND INTENDED PHARMACIST BEHAVIOUR RELATING TO PICTOGRAM USAGE

This chapter reports method and findings from an investigation of current and intended pharmacist behaviour relating to pictogram usage using a quantitative survey which included frequent open-ended responses to explore issues in greater detail. This Phase 2 exploration of pharmacist behaviour relating to pictogram usage is based on outcomes from Phase 1.

## 5.1 Aim and objectives

Phase 2 of this research aimed to expand on and further investigate Phase 1 findings relating to current and intended pharmacist behaviour and opinions concerning pictogram usage. The objectives to achieve this aim include:

1. To determine the support received from other HCPs by pharmacists using pictograms, and to explore anticipated support reported by pharmacists intending to use pictograms.
2. To investigate the influence of current/anticipated pictogram usage on routine pharmacy practice.
3. To investigate pharmacist opinion of how patients have responded or may respond to pictograms.
4. To investigate the barriers identified in Phase 1 encountered/anticipated in pharmacists currently using pictograms, and those intending to use pictograms.

## 5.2 Method

The original intention for Phase 2 had been to conduct semi-structured qualitative interviews with pharmacists online. A limited response to this request was anticipated; however, an unexpectedly high number (125) indicated interest in participating in Phase 2. Discussions between the SO and RD resulted in a decision to pro-actively respond to and acknowledge the sustained interest in this research by offering a larger number of pharmacists the opportunity to contribute to this follow-up phase. A second online quantitative survey was therefore developed.

### 5.2.1 Development of survey

For the Phase 2 survey, attention was paid to limiting the time required for completion to less than 15 minutes as the survey was distributed during the second wave of the COVID-19 pandemic, a demanding time for all HCPs.

The development of the survey followed an intensive, multi-stage iterative process. An initial pool of 30 items was created based on findings from Phase 1. As the perceived behavioural control construct of the TPB in Phase 1 consisted of questions which assessed barriers, the most prevalent barriers were identified, and this informed the creation of the initial pool of items. Section 1 was a general section for completion by all pharmacists which assessed pharmacists' characteristics and initially consisted of seven questions. Pharmacists were then directed to either Section 2 for pharmacists using pictograms (PUPs) or to Section 3 for pharmacists intending to use pictograms (PIPs). These sections included questions assessing current or intended pictogram use, support received, and the influence of barriers identified in Phase 1.

Question format included direct quantitative questions requiring only a tickbox response. Many quantitative questions included open-ended response options, as this phase of the study sought to explore issues at greater depth from these free responses. The construction, length and wording of all survey questions was closely scrutinised and modified by the SO and RD to ensure good readability.

The expert panel interrogated all questions with regard to the following considerations: eradication of repetitive questions, possible problems with question content resulting in participant confusion, necessity to reword questions to avoid confusion or to clarify the focus. During this process, the question format was often revised in an attempt to achieve optimal responses. The final survey consisted of three sections, with a total of 39 questions; however, pharmacists would be completing only two of the three sections in the survey.

Content validity was achieved by a rational analysis of the survey questions. The research team (SO, RD and the expert panel) audited all questions in terms of understandability, interest in the survey, visual impact, relevance to practice, time of completion, readability,

comprehensiveness and clarity. As the sample size was less than 30, Cronbach's alpha could not be performed to asses internal consistency of PUPs and PIPs sections of the survey (131).

### 5.2.2 Final survey

***Section 1: Your current practice (7 questions)***

Questions collected data relating to current practice site, location of current practice site, number of individuals working in the pharmacy, position in their workplace, how pharmacists became aware of pictograms and what stimulated their interest and desire to work with pictograms.

***Section 2: Pharmacists currently using pictograms (19 questions)***

Questions covered where PUPs sourced their pictograms, how they are using them in their practice, support they received from their manager/supervisor or other pharmacists and how they overcame the most prevalent barriers identified from Phase 1.

***Section 3: Pharmacists thinking of using pictograms in the future (13 questions)***

In this section questions covered awareness of other pharmacists using pictograms, the support they might anticipate from their manager/supervisor or other pharmacists in initiating pictograms, how they plan on using them in their practice site and how they plan to address the most prevalent barriers identified from Phase 1.

### 5.2.3 Ethical considerations

As Phase 2 differed from the original approved research proposal, an amendment application was submitted to the Higher Degrees Committee of the Rhodes University Faculty of Pharmacy for approval. Following approval from this committee (Appendix L), an amendment application was submitted to the Rhodes University Ethical Standards Committee. Permission to continue with the revised study was obtained (2020-1643-4680) (Appendix M).

### 5.2.4 Distribution of online survey

A Microsoft Excel spreadsheet was created containing the email addresses of pharmacists who had voluntarily offered to participate in Phase 2. A total of 125 pharmacists had indicated that they were interested in taking part in Phase 2. The email invitation to the pharmacists contained a summary of the project, an assurance of confidentiality and a link to the survey (Appendix

N). Clicking on the designated link directed pharmacist to the survey, where participants read a brief statement (Appendix O) introducing them to the survey (Appendix P). An informed consent section required completing before the survey was initiated.

The first distribution of the survey was done by email on 7 April 2021. Approximately 119 emails were sent while approximately 116 were received by pharmacist. This was due to incorrect email addresses. One reminder email (Appendix Q) to request completion of the survey was sent after two weeks (21 April 2021). The link for the survey was accessible for one month (7 April 2021 – 7 May 2021). All information remained confidential throughout the process.

### 5.2.5 Analysis of data

All responses were automatically captured on the Google form spreadsheet and converted to numerical responses. Frequencies for all questions were generated. Content analysis was undertaken for the free response comments by following the steps below:

1. Reading and re-reading the set of comments
2. Devising a coding frame to describe the thematic content of the comments
3. Assigning codes to all comments
4. Treating the codes as variables in a quantitative analysis which generated frequency and proportion data (132).

## 5.3 Results

### 5.3.1 Pharmacist characteristics

Based on the high number of pharmacists who indicated interest in participating in Phase 2, a response of 125 pharmacists was expected, however only 37 surveys were captured during the collection period for a raw response rate of 29.6%. Two surveys were deleted as they were duplicates. Thus the number of useable surveys was 35, yielding a 28% (35/125) response rate. Due to the unexpectedly low response rate, numbers instead of percentages have been used when reporting results of the PUPs and PIPs groups. The characteristics of pharmacists are shown in Table 5.1

Table 5.1: Pharmacist position and practice site, n = 35

| **Position and practice site** | **Frequency n (%)** |
|---|---|
| Position | |
| Responsible pharmacist | 10 (28.5) |
| Manager | 4 (11.4) |
| Pharmacist | 8 (22.9) |
| Part-time pharmacist | 3 (8.6) |
| Locum | 5 (14.3) |
| Other | 5 (14.3) |
| Current practice site | |
| Community pharmacy-private/corporate | 11 (31.4) |
| Hospital/primary care clinic | 14 (40.0) |
| Medical aid/pharmaceutical industry/consultant | 5 (14.3) |
| Academia/other | 5 (14.3) |
| Location of current practice site | |
| Eastern Cape | 7 (20.0) |
| Free State | 1 (2.9) |
| Gauteng | 10 (28.5) |
| Kwazulu-Natal | 3 (8.6) |
| Northern Cape | 1 (2.9) |
| North West | 1 (2.9) |
| Western Cape | 12 (34.2) |
| Personnel numbers | |
| Pharmacists | |
| 1 | 5 (14.3) |
| 2 | 9 (25.7) |
| 3 | 7 (20.0) |
| 4 – 6 | 6 (17.1) |
| >7 | 8 (22.9) |
| Community service pharmacists | |
| 0 | 27 (77.1) |
| 1 | 5 (14.3) |
| 2 | 2 (5.7) |
| 3 | 1 (2.9) |
| Pharmacy interns | |
| 0 | 27 (77.1) |
| 1 – 3 | 5 (14.3) |
| 4 – 10 | 3 (8.6) |
| Pharmacist assistants | |
| 0 | 3 (8.6) |
| 1 | 10 (28.6) |
| 2 | 7 (20.0) |
| 3 – 6 | 6 (17.1) |
| >7 | 9 (25.7) |

The majority of pharmacists either held the position of responsible pharmacist or pharmacist (51.4%) and worked at either a hospital/primary care clinic (40%) or in a community pharmacy (31.4%). The Western Cape and Gauteng provinces accounted for 62.7% of participants. The most common number of pharmacists at the participants' workplace was either two or three.

Those reporting more than seven pharmacists would typically be from a larger public sector hospital.

### 5.3.2 Support with initiating pictograms

Table 5.2 shows responses relating to both support that PUPs received and support that PIPs anticipated receiving with initiating pictograms. Most PUPs initiated pictogram use with pharmacist colleagues in the same workplace (8/12), and 6/7 reported being supported in this process by their manager or supervisor. One pharmacist reported "I am the Responsible Pharmacist and encouraged everyone to use the sticker pictograms". [P31] Some PUPs (4/12) were also supported by pharmacists working elsewhere. Collaboration with fellow health professionals, most notably nurses and doctors, was reported by 5/12.

The pictograms used by PUPs were mainly sourced online (6/12). Pictograms were obtained online by using Google as an online search engine as reported by one PUP, "I googled and printed the appropriate pictures". [P37] Pictograms were also sourced from PILs found online, "Yes, from the PIL[s] we get from websites [which have] information and sometimes pictures". [P03] One PUP sourced pictograms from an advertising agency and another from Rhodes University.

A few PUPs designed and drew their own visuals.

> *"I do not use approved or standardized pictograms. I generally gauge whether the patient understands what I am saying and if not then I pull out an A4 page and draw my own pictogram, based on the message that I need to convey." [P06]*

> *"A colleague suggested that we have a stamp made with 4 pictograms to indicate time of day the patients have to take their medicine." [P21]*

Only one of the 23 PIPs was aware of another pharmacist using pictograms. Most PIPs anticipated receiving support from managers/supervisors and pharmacist colleagues (15/23) if they were to initiate pictogram use. One reported, "Yes, they would be happy to have a way to reaffirm the information given to the patient". [P08] Another anticipated support from colleagues, stating, "Yes, especially when there is a communication barrier". [P10]

Table 5.2: Support with current pictogram use or with initiating pictogram use

| **Pharmacists currently using pictograms, n = 12** | **Frequency n (%)** | **Pharmacists intending to use pictograms, n = 23** | **Frequency n (%)** |
|---|---|---|---|
| Initiated use of pictograms | | Know of other pharmacists using pictograms | |
| Alone | 4 (33.3) | Yes | 1 (4.3) |
| With pharmacist colleagues | 8 (66.7) | No | 22 (95.7) |
| Supported by manager/supervisor | | Anticipated support from manager/supervisor | |
| Yes | 6 (50.0) | Yes | 15 (65.0) |
| No | 1 (8.3) | No | 1 (4.0) |
| N/A | 5 (41.7) | Maybe | 7 (30.0) |
| Supported by pharmacists from elsewhere | | Anticipated support from workplace pharmacists | |
| Yes | 4 (33.3) | Yes | 18 (78.3) |
| No | 8 (66.7) | Maybe | 5 (21.7) |
| Collaboration | | | |
| Nurse | 4 (33.3) | | |
| Doctor | 1 (8.3) | | |
| N/A | 7 (58.4) | | |
| Sourced pictograms | | | |
| Online | 6 (50.0) | | |
| Hand drawn by self | 4 (33.3) | | |
| Other | 2 (16.7) | | |

Using a 7-point Likert scale (1 = very difficult; 7 = very easy), the 12 PUPs were asked to rate how difficult it had been to introduce pictograms at their practice site (Figure 5.1). Three-quarters of pharmacists (9/12) rated the degree of difficulty as somewhat to very easy, with nearly half (5/12) selecting the degree of difficulty as 'Easy'. One pharmacist offered, "Everyone was on board and we started using them without any issues". [P31]

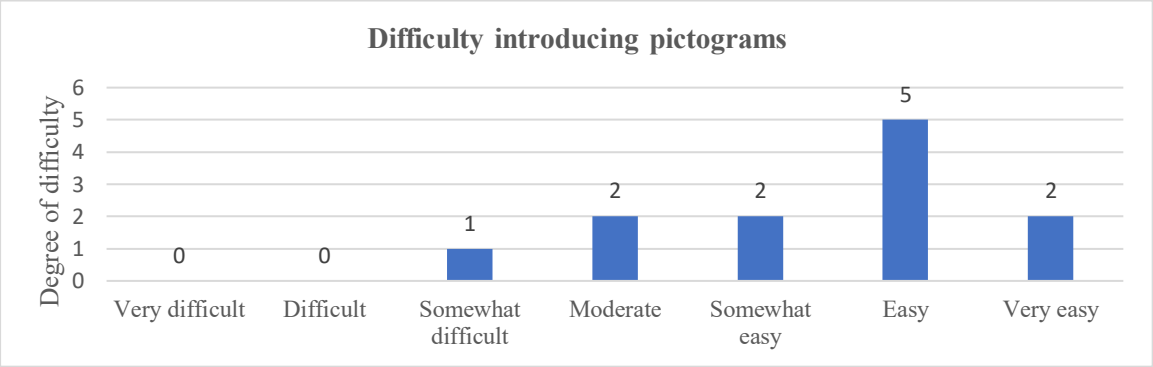


Figure 5.1: Difficulty introducing pictograms

### 5.3.3 Influence of pictogram use on patients and on pharmacist practice

Table 5.3 shows responses relating to health literacy and patient response or anticipated response to pictogram usage. Half of PUPs (6/12) rated the health literacy of their patients as moderate. One PUP reported, "Our patients are mostly older patients on chronic medication" [P31] and another reported, "Patients understand their condition but not necessarily how the medication will help or harm them". [P06]

There was an even spread with regard to patients commenting on the use of pictograms, with 5/12 PUPs indicating patients offered some comments. One reported, "The patients told me that they appreciate the effort to educate them and that they felt well looked after". [P14] Another commented, "The patients were asked directly, and they liked and preferred the pictograms as compared to text only". [P15] Some PUPs indicated that patients offered zero comments, "I haven't had feedback from patients directly". [P23] and one reported, "I am not sure, but when they start to answer with words I know. It's an assurance that they have got some information". [P03] Most PUPs reported that patients reacted positively to pictograms (7/12) and all 12 PUPs indicated receiving no patient complaints about the inclusion of pictograms on their medicine.

Table 5.3: Patient response/anticipated response to pictogram usage

| **Pharmacists currently using pictograms, n = 12** | **Frequency n (%)** | **Pharmacists intending to use pictograms, n = 23** | **Frequency n (%)** |
|---|---|---|---|
| Average health literacy of patients | | Average health literacy of patients | |
| Poor | 4 (33.3) | Poor | 1 (4.0) |
| Moderate | 6 (50.0) | Moderate | 17 (74.0) |
| Good | 2 (16.7) | Good | 5 (22.0) |
| Did patients comment on the use of pictograms? | | Would you use pictograms for high health literacy patients? | |
| Yes | 5 (41.7) | Yes | 7 (30.0) |
| No | 3 (25.0) | No | 7 (30.0) |
| Unsure | 4 (33.3) | Maybe | 9 (40.0) |
| How did patients react to having pictograms on their medicine? | | Will patients welcome pictograms on their medicine? | |
| Positive | 7 (58.3) | Yes | 13 (56.5) |
| Neutral | 5 (41.7) | Maybe | 10 (43.5) |
| Any patient complaints about pictograms on their medicine? | | | |
| None | 12 (100.0) | | |

Table 5.4: Effect of pictograms on pharmacist practice

| **Pharmacists currently using pictograms, n = 12** | **Frequency n (%)** | **Pharmacists intending to use pictograms in the future, n = 23** | **Frequency n (%)** |
|---|---|---|---|
| Positive effect of pictograms on patient communication | | Any benefits you foresee in using pictograms? | |
| Yes | 12 (100.0) | Yes | 22 (95.7) |
| | | Maybe | 1 (4.3) |
| Negative aspects of using pictograms | | | |
| Yes | 1 (8.3) | | |
| No | 11 (91.7) | | |

Nearly three-quarters of PIPs (17/23) rated health literacy as moderate, with one commenting, "We service a wide variety of patients from all over so from high to low literacy". [P01] There was an even split between 'yes' (7/23) and 'no' (7/23) when it came to using pictograms for high health literate patients.

> *"... my experience is that a lot of patients that can read and understand the directions on medication, do not read it completely or they read it and still follow their own thoughts on how to take their medication. Directions with pictograms will get the message across more clearly." [P32]*

One PIP who indicated 'no' to using pictograms for high health literate patients reported, "I feel [pictograms] would undermine them [patients] and [there is] no need". [P01] The remaining nine PIPs indicated that they may use pictogram as it would depend on the patient, reporting, "It would depend on the patient's attitude; I wouldn't want to offend anyone". [P30]

Most PIPs anticipated patients welcoming pictograms on their medication (13/23) if they were to initiate pictogram use. One reported, "It may generate a better understanding than that which is shortly written or printed on a label". [P05]

Table 5.4 shows responses relating to the current effect (PUPs) or potential effect (PIPs) of pictogram use on a pharmacist's practice. All PUPs indicated that pictograms have had a positive effect on their practice, with PIPs being similarly positive about pictogram use.

Only one of the 12 PUPs reported a negative aspect associated with pictogram use.

> *"Some people may interpret the pictogram in a way that was not intended, so the pictograms need to be explained to the patient. You cannot assume all people will have the same interpretation to the same picture." [P15]*

Most PIPs anticipated benefits with pictogram usage (22/23), offering comments such as "…reduced risk of misunderstandings when it comes to dispensing and explaining the use or application of prescribed medications" [P05] and, "Better patient understanding and medicine taking behaviour". [P31]

In Box 5.1, comments from all PUPs on the effect pictograms had on their practice are shown.

Box 5.1: PUP comments on the influence of pictograms on their practice

| Comments |
| --- |
| If they don't understand the language, they can still get the message. |
| Yes, imagine working alone in the deep Mpumalanga and you don't understand the language. So, drawing can help people to understand. |
| Some of the newer formulations used to treat HIV may have side-effects such as insomnia. Showing patients that it should be taken in the morning, which is different to the previous fixed dose combination that they usually took at night, helps patients to understand there is a difference in the effect that the medication will have on them. |
| I feel that empowering patients with managing their own medicines, including dosing, interactions etc. by having user-friendly info is a positive step. |
| Improves compliance. |
| The use of pictograms helps us overcome the language barrier and also took care of patients hard of hearing and it also give them something to remind them of the instructions or information shared when at home. |
| We found that pictograms helped in explaining the information on the label. |
| Telling patients to take medication e.g. three times a day doesn't mean 3 times in 24 hours for the man on the street. But indicating morning, noon and evening with pictograms will improve the patient's understanding of three times a day. This will also minimise the risk of patients taking medication three times in e.g., the morning. |
| Makes explanation from our side and understanding from patient's side more effective. |
| Better understanding. |
| The pictograms do enforce the message you are giving verbally and is a reminder of the instructions. |
| Yes, it gives us a chance to talk about the medicine and how to take it correctly. |

### 5.3.4 Barriers to pictogram use

Using a 4-point Likert scale (1 = Highly significant to, 4 = Of no significance at all), the 12 PUPs and the 23 PIPs were asked to rate how they perceived the most prevalent barriers identified in Phase 1. These included lack of control, cost, increased workload, and pictogram misinterpretation. Results are shown in Figure 5.2

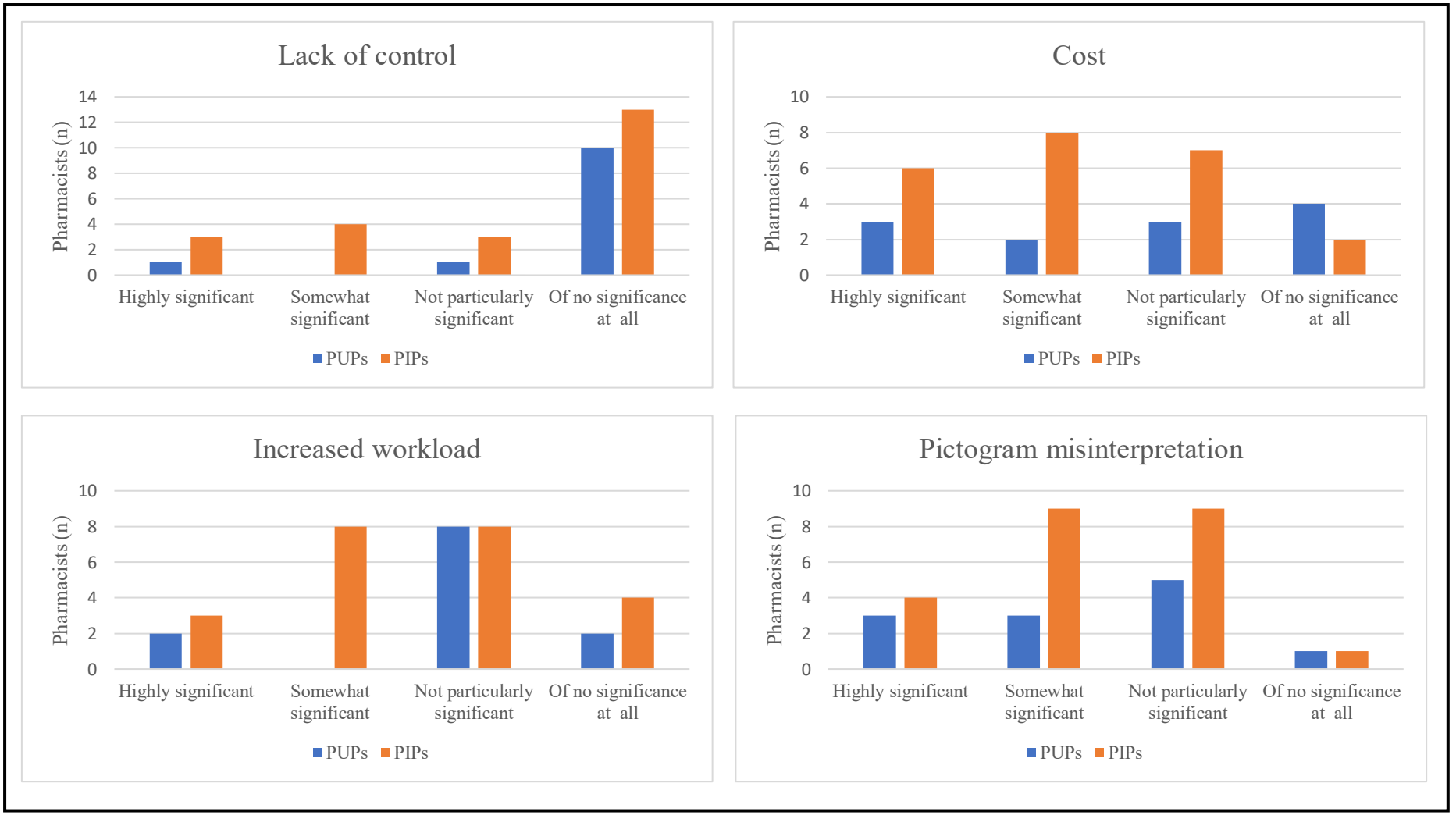


Figure 5.2: Barriers to using pictograms

A majority of pharmacists in both groups did not identify lack of control as being a significant barrier. Two PUPs reported, "… I feel that I do have control over my use of pictograms since I work independently in the dispensary". [P06] and, "Being an independent pharmacy we are able to do what we have to without corporate interference". [P37] More than two-thirds of PIPs (16/23) reported they did not perceive it as a significant barrier offering their opinions of, "I am responsible for deciding and controlling what happens in the pharmacy". [P09] and, "Our pharmacy is very open to new ideas and has a lateral management structure". [P08]

Most PUPs indicated cost as being a non-significant barrier (7/12) with one reporting, "If the pictograms are loaded on the computer and printed on the label it does not add cost or much effort". [P02] Another implemented pictograms at their own cost.

> *"I made the decision, discussed it with owner - which lead to negative outcome and then I decided to implement [pictograms] on my own cost in order to proof its efficacy." [P14]*

In contrast, however, most PIPs did perceive cost to be a significant barrier (14/23), commenting that, "… if required to print as with pre-printed labels, it may be costly… ". [P31] and, "If it is an added cost, yes it [pictogram implementation] will be out of my control". [P30]

Most PUPs did not find increased workload as being a significant barrier (10/12).

> *"Not all members of a team are equally excited / committed to the use of pictograms and/or improving level of Health Literacy of patients we serve. If you are committed to the use of pictograms the extra work for adding stickers to the medicine instructions should not be factor. After all, we are there to ensure that patients adhere to the treatment plan because we all want better health outcomes." [P20]*

Two PUPs, however, reported workload as a highly significant barrier, with one commenting, "… When workload increases and/or pharmacy is understaffed taking time to stick pictograms on medication might be a challenge". [P21]

In contrast, most PIPs perceived increased workload as both 'somewhat significant' (8/23) and 'not particularly significant' (8/23) barrier.

*"... Workload only increases when a pharmacist doesn't work smart and prepare all the pictograms beforehand. Pharmacists can print out the pictograms on their own label printers from a website and have the stickers already at hand when explaining it to patients." [P34]*

Six PUPs rated pictogram misinterpretation as both 'highly to somewhat significant' and 'not particularly' to 'of no significance at all', with one PUP reporting, "Pictogram misinterpretation is a risk, so it will take more time (workload) to get feedback from patient on how they interpret them". [P15] Another commented, "We're worried most about misinterpretation". [P07] Most PIPs reacted similarly to the potential for pictogram misinterpretation, reporting this barrier as being 'somewhat significant' or 'not particularly significant' (9/23).

# CHAPTER 6
# DISCUSSION

This is the first study to explore the relationship between pharmacists and their use of pictograms. It did so by investigating familiarity with pictograms and opinions of using pictograms as a communication tool, as well as establishing the extent of current pictogram use. Future intention to use pictograms in pharmacy practice was established and potential barriers to pictogram use in routine practice were explored. Much of the existing literature has addressed testing comprehension of pictograms, assessing the impact of pictograms on comprehension and recall of health/medicines information, their use either alone or in combination with text and/or verbal instructions, their effect on medicine-taking behaviour and health outcomes and pictogram design (133). However, no research has focused solely on exploring HCPs' opinions relating to using pictograms in routine pharmacy practice. The current study investigates the opinions of pictograms of the health professional most closely involved in ensuring appropriate medicine-taking i.e. the pharmacist.

## 6.1 Pharmacist exposure to and familiarity with pictograms and their use

For baseline exposure to pictograms to be established, this study explored pharmacists' familiarity with pictograms and their use. Although findings showed that many pharmacists were familiar with the term 'pictogram', this did not necessarily translate to an understanding of the properties of pictograms. For example, only 30% of pharmacists correctly identified that pictograms do not represent a universal language that can be automatically understood by all. Three quarters of pharmacists had never observed pictograms being used in a pharmacy setting, a finding that is reflected in the current limited use of pictograms in routine pharmacy practice, despite a large body of published research highlighting the benefits of pictograms (134).

Although visual images such as pictograms are often considered easy to interpret, the pictogram literature contains several examples of the inability of pictograms to convey the intended meaning. Poor comprehension can be explained by the use of pictograms that were poorly designed and were therefore misunderstood, pictograms that are complex and have poor legibility, inadequate research into the initial design process or inappropriate use of pictograms by untrained HCPs (30,69). When pictograms are well-designed, comprehensively tested and

used in combination with verbal and/or written communication, positive patient outcomes such as comprehension and recall of medicines and health information have been shown (4,30,69).

It is important for pharmacists to note that patients prefer locally developed illustrations over pictograms from different cultures (85). As the designing, testing and validation of pictograms from scratch is a rather difficult, rigorous, and time-consuming process, the use of existing pictogram can allow pharmacists to avoid the onerous design process. Currently, there are a few online sources for pictograms. The United States Pharmacopeia (USP) website contains a catalogue of 81 pictograms that can be downloaded. However, as research from several countries has identified comprehension issues, caution should be applied when using them (30). The International Pharmaceutical Federation (FIP) Foundation for Education and Research website contains an international collection of pictograms. Lastly, the Rhodes University website contains a database of 100 pictograms designed for end-users with limited reading skills and varying literacy skills (135). However, using existing pictograms presents certain limitations, as pharmacists cannot assume the pictograms are well suited for their particular patient population. Therefore, whether using existing pictograms or developing new ones, it is crucial for pharmacists to pilot test pictograms to maximise their local relevance, comprehension and clarity (4,30).

### 6.2 Survey pharmacists' opinions of pictograms

The pharmacists were shown examples of 17 pictograms designed at Rhodes University for a lower health literate population. Most of the pictograms had undergone a rigorous design or modification process, followed by comprehension evaluation and determination of acceptability to patients. Pharmacist reaction to the pictograms was largely positive, a finding also reported by Shiyanbola et al (94). Many pharmacists noted that, in their opinion, the design and overall look of the pictograms would make it easy for patient comprehension. Interestingly, just over half indicated that most of the pictograms presented were easy for them to understand but there were a few pictograms such as the vomiting, complete the course, take with food, and skin rash that caused interpretation problems.

In line with research that has investigated patients' opinions of pictograms showing that correctly prepared and validated pictograms are greatly accepted by patients (76,85,136,137)

and that low literate patients in particular consider pictograms to be useful (84,138), most pharmacists in our study believed patients would accept pictograms on their medication and approve of pictograms being used for counselling. Furthermore, half of pharmacists thought that pictograms should only be used for certain at-risk population groups, with one-third of pharmacists who intended to use pictograms in the near future indicating they would not use pictograms for high health literate patients. In accordance with review findings by Katz et al. (85) most pharmacists thought that including pictograms with written medicine information would make it easier for patients to comprehend the information, however there is potential for differences between pharmacists and lay citizens' opinions (139).

Certain at-risk population groups who stand to benefit the most from pictograms include refugees and ethnic minorities who do not understand the native language and who therefore encounter communication barriers, as well as low literacy individuals with limited reading ability who are more likely to be non-adherent. This frequently results in higher healthcare costs (69). The elderly represent another at-risk group as they have greater difficulty remembering medication information and adhering to dosage schedules. They also exhibit age-related loss in recall of information and are more likely to have impaired vision which contributes to non-adherence (69). Even though we have certain at risk-population groups who benefit the most from pictogram use, research in psychology and marketing indicates humans have a cognitive preference for picture-based information compared to text-based information. This is commonly referred to as the 'picture superiority effect' (140,141) and supports the view that pharmacists and other HCPs should be encouraged to use pictograms for all patients (74,85,111,138,142,143).

As highlighted by a survey of community pharmacies done by Praska et al. (144), pharmacists only infrequently attempt to identify and assist patients with limited literacy skills, with only 7% taking proactive steps to identify such patients who may need additional assistance (144). This low figure is in line with the current health literacy literature in the pharmacy profession, with Andrus and Roth (145) in their review of health literacy describing how pharmacists and other HCPs did not take the time to ensure patients understood their health conditions, the correct administration of their medicines and general medicine instructions. As the process of reading and comprehending information is a large part of pharmacists' and other HCPs' daily lives, they often assume their patients can read and understand information sufficiently. Additionally, Youmans and Schillinger (146) in their opinion paper regarding the pharmacist's

role in health literacy and medication, note the increasingly significant responsibility the pharmacy profession has to not only educate its own members regarding health literacy, but to also advocate that pharmacists start providing more services to low-literacy patients. Based on how little is known in the pharmacy literature about how pharmacists address low literacy (145,146) and the tendency of patients who have trouble reading or understanding health information to hide this difficulty due to embarrassment or failure to recognise the limitations of their reading ability (144), pharmacists should be encouraged to use pictograms to ensure effective counselling of low literate patients.

There is a dearth of literature showing which categories of medicines information, in the pharmacist's opinion, should be supported with the use of pictograms. More than 85% of pharmacists felt that pictograms should be used for dosage instructions, auxiliary or additional information, warnings, and storage instructions. However, fewer (58-68%) felt that indication, side effects and risk communication information should be accompanied by pictograms. This tends to align with existing findings offering opinions on the categories of medicine information for which pictograms can be used (64,69,84,94,138,147,148). All but one of these research papers are by R. Dowse and her associates at Rhodes University.

### 6.3 Survey pharmacists' use of pictograms

A surprisingly high number of pharmacists in the Phase 1 survey reported having used pictograms at some stage in their practice. They noted that pictograms had been used to overcome communication barriers, counsel patients on how to use medication and to explain health conditions to patients. This is in line with reasons for using pictograms as highlighted in some reviews of the pictogram literature (4,69,85).

The Phase 2 survey aimed to expand on and further explore Phase 1 survey findings relating to intended and current pharmacist behaviour and opinions concerning pictogram usage. In this follow-up survey, only a relatively small number of pharmacists reported routinely using pictograms. Of these, two-thirds had initiated pictogram use with other pharmacist colleagues, and a half were actively supported by their manager/supervisor. Carlfjord et al. (149) notes how vital support is for pharmacists when implementing a new intervention, and this is shown

in the current study where three-quarters of the pharmacists reported finding the process of introducing pictograms in their practice as easy.

Age was significantly negatively correlated with using pictograms in practice, indicating that older pharmacists are less likely to use pictograms in their practice. This supports previous findings that older pharmacists are more reluctant to introduce new interventions (150). The digital divide between current younger and older generations may have also contributed to this trend as half of pharmacists who routinely use pictograms sourced them online.

In their systematic review, Moecker et al. (151) described the achievement of interprofessional communication and patient acceptance as two critical factors in implementing an intervention in pharmacy. In our study, four pharmacists had collaborated inter-professionally with nurses and one with a doctor to introduce pictograms in their practice. All 12 pharmacists who had used pictograms reported receiving no complaints from patients when pictograms were used with their medicine. Significantly, all pharmacists using pictograms reported a positive effect on patient communication, with almost all having encountered no negative aspects of using pictograms.

### 6.4 Theory of planned behaviour and pharmacist intention to use pictograms

The TPB posits that behavioural intention directly determines actual behavioural performance and that the three constructs of attitude, subjective norm, and perceived behavioural control determine behavioural intention (14). Questions for each construct of the TPB were designed to investigate the significance of the relationship with the intention to use pictograms in routine pharmacy practice. To the researcher's knowledge, this is the first study to examine pharmacists' intention to use pictograms in routine pharmacy practice using the TPB framework.

One way to assess the usefulness of the study model is to examine the variance represented by the R-squared value, with a higher R-squared value representing smaller differences between the observed data and the fitted values. This results in an improved regression model fitting the observations being made. Our study effectively supported the TPB, explaining a significant amount of variance (53%) in the intention to use pictograms. The variance explained by the

TPB constructs in our study compared favourably to previous TPB research (152–154), including a meta-analytic review of the efficacy of the TPB, which reported the average variance in intention to be 39% (155).

Overall, findings from the Phase 1 survey indicated a neutral intention to use pictograms in routine practice. This finding could be explained due to the growing body of pictogram research, but minimal adoption of pictograms in routine practice. The neutral intention found in our study offers some encouragement as it shows pharmacists are not against the use of pictograms. Although pharmacists expressed generally favourable attitudes towards using pictograms in routine practice, findings showed that attitude was not significantly related to intention.

Pharmacists reported a neutral perceived behavioural control, with this construct presenting a negative but significant association with pharmacist intention to use pictograms in routine practice. This is interpreted as the higher the perception of a pharmacist's ability towards using pictograms in practice, the lower their intention to use pictograms routinely in practice. The TPB literature shows mixed results about the role of perceived behavioural control in predicting intention; it was a significant predictor in medication therapy management services provision (20), asthma counselling (21) and prescription drug monitoring program utilisation (156). However, it was not a significant predictor for adverse drug event reporting (19). This current study did not find perceived behavioural control to be a significant construct in predicting pharmacists' intention. Researchers have recommended that more TPB studies should be conducted to investigate the significance of perceived behavioural control in predicting intention in the pharmacy profession (157).

The most prevalent barriers towards using pictograms in routine practice as indicated by the perceived behavioural control construct were lack of control, pictogram misinterpretation, increased workload, and cost. However, after further investigation of these barriers in pharmacists who either were using pictograms routinely or were intending to use pictograms in the near future, only misinterpretation of pictograms was found to be a prevalent barrier common to both current and intended use.

Increased workload was regarded as a prevalent barrier to pharmacists intending to use pictograms, as additional patient counselling would be required which was viewed as a

deterrent. However, as discussed by Dowse and Ehlers (69), patients who would attain the most benefit from pictograms will be those patients who will require additional counselling; pictograms would therefore supplement the patient counselling responsibility.

In line with other studies that have examined pharmacists' intention in providing medication-related services (19–21), subjective norm was found to be the strongest predictor of intention. This is further highlighted in our study as most pharmacists expressed that they would support a national Department of Health initiative for pharmacists to use pictograms, suggesting that policies from the NDoH encouraging use of pictograms could influence pharmacist intention. On the other hand, pharmacists may feel the need to comply with NDoH for fear that inaction could result in disciplinary measures. Pharmacists, perhaps more than any other HCPs, may feel more pressure from regulatory agencies/authorities to perform specific behaviour to benefit patients or satisfy regulatory requirements (158). This could result in adverse outcomes, as it is essential that pharmacists 'buy in' to the importance and value of an intervention for it to be successful (159).

The findings of this study relating to the introduction of pictogram use by pharmacists in their practice support the development of guidelines which consider pharmacists' expectations from other HCPs, and approval from their supervisor/manager as these may be a stimulus to positively influence pharmacists' intention. Previous studies have found intention to be a good predictor of subsequent behaviour (157). If pharmacists' intention to use pictograms could be positively influenced, routine pictogram use may increase. However, it is essential to note that research has also shown that intention does not necessarily predict actual behaviour (160).

### 6.5 Strengths and limitations

This study was the first national study of pharmacists to adopt a theoretical approach to consider pharmacists' intention to use pictograms in routine pharmacy practice. The study used a quantitative methodology with surveys that also encouraged free responses to enable deeper interrogation of areas of interest and the generation of rich data. This also allowed for new perspectives on the topic being investigated to be revealed.

Additional strengths included a good representation of both younger and older pharmacists, as reflected in the mean age being 43.5 ± 14.1.

The results of this study should be interpreted with potential limitations in mind. The literature review findings in section 2.6.1 included only 0.13% of 11571 retrieved articles indicating a less exact search string. The Phase 1 survey did not include a definition of 'literacy' which resulted in pharmacists using their presumptions of literacy, which may vary substantially.

This study was survey-based and relied on honest reporting from pharmacists, so it is possible that some responses may not reflect the actual current status of familiarity, knowledge, and practice. Additionally, the collection of data using a self-report approach might have been influenced by social desirability bias of respondents. However, results were anonymised to minimise this threat. Due to both surveys being online, some pharmacists reported difficulty accessing the content as some web browsers had identified the link as spam. This may have resulted in less-than-optimal numbers completing the survey.

Although there was a low response rate for both surveys, our response rates compared well with reported averages for online surveys of health professionals (161). The low response rate in our study could be due to several factors, including lack of time as both surveys were released amid the COVID-19 epidemic. There is also the possibility that pharmacists had survey fatigue due to the numerous email invitations received to participate in various studies. Additionally, the email distribution was sent from a Rhodes University address, and participants may have been more likely to respond had it come from a pharmacy-related organisation.

The cross-sectional study design cannot investigate changes in pharmacists' intention, and the other TPB constructs and causality among variables cannot be derived in this study. As the research was conducted with pharmacists registered with the SAPC who have been exposed to pictogram research through conferences and some through their undergraduate pharmacy curriculum in South Africa, the findings of this research are therefore not necessarily generalisable to pharmacists in other countries.

# CHAPTER 7
# CONCLUSIONS AND RECOMMENDATIONS

This thesis investigated pharmacists' opinions relating to pictograms, how they should be used, and pharmacists' possible intention to adopt the use of pictograms. Although many South African pharmacists knew about pictograms, they did not necessarily have an adequate understanding of their use, for example incorrectly considering them as being universally understood, as well as not appreciating the high likelihood of pictograms being misinterpreted. However, they generally expressed a positive attitude to pictograms, and they were impressed with the design and overall look of the South African pictograms shown to them. The TPB theoretical model was used to inform study design and to interrogate the results.

Pharmacists who participated in the study generally felt that patients would like to see pictograms on their medication, and that pictograms would be a good communication tool for counselling. Some pharmacists felt that pictograms should only be used for certain at-risk patient groups, whereas those pharmacists who said they were likely to adopt the use of pictograms were of the opinion that they would be unlikely to use pictograms for patients with high health literacy.

Pharmacists generally agreed that all medicine packaging should contain pictograms, recommending that pictograms should be used for dosage instructions, auxiliary or additional information, warning, storage, indication, side effects, and risk communication. Recommendations for new applications for pictograms were offered, such as expiry dates and disposal instructions.

Age was noted as playing a role in pictogram use as older pharmacists with more years of practice were less likely to use pictograms than younger pharmacists who have fewer years of practice. Pharmacists who reported using pictograms used them to overcome communication barriers, counsel patients on how to use medication and explain health conditions to patients. Pharmacist colleagues and managers/supervisors were generally supportive of pharmacists who used pictograms; furthermore, pharmacists did not feel it was overly challenging to introduce pictograms at their practice site. Pharmacist-patient communication was reported to be positively affected with routine pictogram use.

Barriers to pictogram use such as lack of control, pictogram misinterpretation, increased workload and cost were identified in the Phase 1 national survey. However, only misinterpretation of pictograms was a significant barrier to both pharmacists using pictograms and those planning to use pictograms in the future. Meanwhile, increased workload was the only significant barrier for pharmacists who planned to use pictograms.

This was the first study to examine pharmacists' intention to use pictograms in pharmacy practice supported by a theoretical model, in this case the TPB. Pharmacists expressed favourable evaluations of using pictograms, however this did not translate to attitude being a significant predictor of intention. Perceived behavioural control, which refers to a pharmacist's perception of the ease or difficulty of using pictograms, had an interesting negative relationship with intention, implying that pharmacists with a higher perception of their ability to use pictograms in practice had a lower intention of using them. Pharmacists' subjective norm, which refers to pharmacists' perceived social pressure to perform or not perform a behaviour, in this case, using pictograms, emerged as the strongest predictor of intention; this suggests that intention to use pictograms may potentially be increased through guidelines that consider pharmacists' expectations from other HCPs, and approval from their supervisor/manager.

Future research could duplicate aspects of this study and compare results between, for example, HICs and LMICs, as practice setting and patient demographics in these countries are likely to differ widely. Another area that merits further investigation is the opinions of other HCPs regarding use of pictograms as a communication tool in health. Finally, a study similar to the one described in this thesis could investigate the impact of external factors such as practice characteristics on the intention to use pictograms routinely, as this study only used the TPB constructs in the structural equation modelling analysis.

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# APPENDICES

# APPENDIX A

# RHODES UNIVERSITY ETHICAL STANDARDS COMMITTEE APPROVAL


**Human Ethics subcommittee**
**Rhodes University Ethical Standards Committee**
PO Box 94, Grahamstown, 6140, South Africa
t: +27 (0) 46 603 8055
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www.ru.ac.za/research/research/ethics
**NHREC Registration no. REC-241114-045**

01/10/2020

Mr. Sam Okeyo

Email: g16o3289@campus.ru.ac.za

Review Reference: 2020-1643-4680

Dear Prof Roslind Dowse

**Title:** Pharmacists' attitudes and perception of using pictograms as a

communication tool in practice Principal Investigator: Prof Roslind Dowse

Collaborators: Mr. Sam Okeyo,

This letter confirms that the above research proposal has been reviewed and **APPROVED** by the Rhodes University Human Ethics Committee (RU-HEC). Your Approval number is: 2020-1643-4680

Approval has been granted for 1 year. An annual progress report will be required in order to renew approval for an additional period. You will receive an email notifying when the annual report is due.

Please ensure that the ethical standards committee is notified should any substantive change(s) be made, for whatever reason, during the research process. This includes changes in investigators. Please also ensure that a brief report is submitted to the ethics committee on the completion of the research. The purpose of this report is toindicate whether the research was conducted successfully, if any aspects could not be completed, or if any problems arose that the ethical standards committee should be aware of. If a thesis or dissertation arising from this research is submitted to the library's electronic theses and dissertations (ETD) repository, please notify the committee of the date of submission and/or any reference or cataloging number allocated.

Sincerely,

**Prof Arthur Webb**

**Chair: Rhodes University Human Ethics Committee, RU-HEC**

cc: Mr. Siyanda Manqele - Ethics Coordinator

# APPENDIX B

# PARTICIPANT INFORMATION STATEMENT FOR PILOT STUDY


**Pharmacists' attitudes and perception of using pictograms as a communication tool in practice**

**Investigators:**

| | | |
|---|---|---|
| Mr Sam Okeyo: | Email: g16o3289@campus.ru.ac.za | Mobile: 072 292 2642 |
| Professor Ros Dowse: | Email: r.dowse@ru.ac.za | Mobile: 083 556 9796 |


Please read the Participant Information Statement which provides brief information about this study. Participation in this research study is voluntary.

**What is this study about?**

You are invited to take part in the above research study. This is a pilot study which aims to test the content, understandability of questions, ease of completion and time taken of an online survey that has been developed for pharmacists. The researchers involved in this study are from Rhodes University and include Mr Sam Okeyo (MPharm student) and Professor R Dowse (supervisor).

This Participant Information Statement tells you about the research study. Knowing what is involved will help you decide if you want to take part in the research. Please read this sheet carefully and ask questions about anything that you don't understand or want to know more about. Participation in this research study is voluntary.

By giving your consent to take part in this study you are telling us that you understand what you have read and agree to take part in the research study as outlined below.
You will be given a copy of this Participant Information Statement to keep.

**What will the study involve for me?**

You will be asked to complete the online survey, after which you will be interviewed about your experience. We would appreciate any comments in order to improve the survey.

With your permission, we will audio-record the interview. No personal information will be collected from you except your name which will be replaced by a code during data analysis. All aspects of the study will be strictly confidential and only the investigators will have access to the information collated as part of this research.

**How much of my time will the study take?**

The survey should take approximately 10-15 minutes for you to complete, while the face-to-face interview will last between 10-15 mins.

**Can I withdraw from the study once I have started?**
Being in this study is completely voluntary and you do not have to take part. Your decision whether to participate will not affect your current or future relationship with the researchers or anyone else at Rhodes University. You are free to withdraw at any time, without penalty or prejudice.

**Are there any risks or costs associated with being in the study?**
Aside from giving up your time, we do not expect that there will be any risks or costs associated with taking part in this study.

**Are there any benefits associated with being in the study?**
We cannot guarantee that you will receive any direct benefits from being in the study.

**Can I tell other people about the study?**
Yes, you are welcome to tell other people about the study.

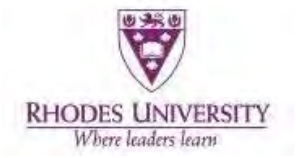
**Will I be told the results of the study?**
You have a right to receive feedback about the overall results of this study. This feedback will be in the form of a one-page summary. You will receive this feedback via email once the study has been completed.

**What if I would like further information about the study?**
For any additional information contact:

| | | |
|---|---|---|
| Mr Sam Okeyo: | Email: g16o3289@campus.ru.ac.za | Mobile: 072 292 2642 |
| Professor Ros Dowse: | Email: r.dowse@ru.ac.za | Mobile: 083 556 9796 |

# APPENDIX C

# CONSENT FORM FOR PILOT STUDY




**Pharmacists' attitudes and perception of using pictograms as a communication tool in practice**

I, ..... [PRINT NAME], agree to take part in this research study.

In giving my consent I state that:

- I understand the purpose of the study, what I will be asked to do, and any risks/benefits involved.
- I have read the Participant Information Statement and have been able to discuss my involvement in the study with the researchers if I wished to do so.
- The researchers have answered any questions that I had about the study and I am happy with the answers.
- I understand that being in this study is completely voluntary and I do not have to take part.
- My decision whether to be in the study will not affect my relationship with the researchers or anyone else at Rhodes University now or in the future.
- I understand that I can withdraw from the study at any time.
- I understand that I may stop the survey at any time if I do not wish to continue.
- I understand that no personal information except my name will be collected
- I understand that the results of this study may be published, and that publications will not contain my name or any identifiable information about me.
- I consent to the interview being audio recorded.

| ..... | ..... | ..... |
|---|---|---|
| **Participant signature** | **Witness** | **Date** |

# APPENDIX D

# GUIDE FOR SEMI-STRUCTURED PILOT INTERVIEW

In general, were the questions easy to understand?

Were there any questions where you had problems understanding what was required?

Did you find the survey interesting to complete?

Do you think the questions covered all aspects of the topic?

What do you feel about the different topics – did they make sense to you?

Would you change the order of any of the sections?

What do you think about this survey in terms of its visual impact (colour, font, font size, user-friendly etc.)

Do you think this research focus is relevant to pharmacy practice?

This survey took you (xx min) to complete – do you think that's ok when asking a full-time working pharmacist to complete this (especially during the COVID-19 epidemic)?

Do you have any suggestions about how I could encourage pharmacists to respond to the survey?

Overall, what did you think of this survey?

# APPENDIX E

# RHODES UNIVERSITY COVID-19 DAILY SELF-SCREENING FORM

RHODES UNIVERSITY
*Where leaders learn*

## COVID-19 DAILY SELF ASSESSMENT SCREENING QUESTIONNAIRE
## (to be handed in at the access point and/or completed at the access point)

**If you answer YES to any of the symptom questions you should not come to work, if you do you will not be permitted to enterthe workplace.**
**If you have not completed the Initial Assessment and Training you are not permitted to enter the workplace.**

| | |
|---|---|
| Name of Staff Member/Visitor | |
| Identity number of staff member/Visitor | |
| Staff number (staff only) | |
| Company (visitors) | |
| Purpose of Visit (visitors) | |

| **Do you have any of the following symptoms?** | | |
|---|---|---|
| Fever (high temperature) | Yes | No |
| Cough | Yes | No |
| Sore throat | Yes | No |
| Shortness of breath | Yes | No |
| Myalgia (general weakness) | Yes | No |
| Loss of taste (ageusia) | Yes | No |
| Loss of sense of smell (anosmia) | Yes | No |
| Body aches | Yes | No |
| Redness of the eyes | Yes | No |
| Nausea/vomiting/diarrhoea | Yes | No |

| | | |
|---|---|---|
| Have you done the Initial Risk Assessment? | Yes | No |
| Have you done the training and/or watched the training video online? | Yes | No |

| | |
|---|---|
| I hereby certify that the information I have provided in this form is complete, true and accurate and I give permission for the University to validate any information provided. | |
| In line with the Protection of Personal Information Act, you are required to give permission for the University to check the accuracy of any information provided. Should it become apparent that the information you have providedis false our disciplinary procedures and processes will apply. In the case of visitors you will not be permitted to enter the campus in the future and your company will be advised. | |
| Signature | |
| DATE | |

# APPENDIX F

# NATIONAL ONLINE SURVEY FOR PHASE 1

## Section 1: Demographic characteristics and work history

2. Age_____

3. Gender
   M/F/Other

4. Highest qualification
   BPharm; Masters; PharmD; PhD; Other

5. Additional qualifications: _____

6. The year you registered as a pharmacist: _____

7. Your total years of practice (include all practice sites): _____

8. Current practice site
   Community pharmacy - private
   Community pharmacy - corporate
   Hospital - public
   Hospital – private
   Primary care clinic
   Medical aid industry
   Pharmaceutical industry
   Consultant pharmacist
   Specialist pharmacy service
   National/provincial department of health
   Academia
   Other: _____

9. Do you communicate directly with patients at your current practice site?
   Y/N/N/A

10. Do you use an interpreter to communicate with patients at your current practice site?
   Y/N/N/A

11. Approximate number of patients seen in a day
   ≤20; 21-50; 51-75; 76-100; ≥100
   N/A

12. At your current practice site, how would you rate the **average literacy level** of your patients?

Poor; Moderate; Good; Excellent; N/A

13. Internet access at your practice site
Y/N

## Section 2: Familiarity with pictograms

14. Are you familiar with the word "pictogram" as used in healthcare?
Y/N/Partly

15. Do you agree that pictograms are a universal language and can be understood by all?
Y/N/Partly
If 'partly' is your choice, could you clarify?: _____

## Here are examples of some pictograms that have been designed for patients in South Africa:
## Dosage instructions, Auxiliary or additional information, Administering medication, Storage, Side effects, Indication, TB pictograms

16. What is your instinctive gut reaction to these pictograms?
(Choose 1,2 or more options below)
Caught my interest immediately
Doesn't really apply to me so wasn't attracted to them
I like them
They don't interest me
Attracted my attention
I would like to know more about them
I would like to use them
I can't see them being of much use in pharmacy
Your comments: _____

18. Any other comments to pictograms shown above

## Here are the pictograms again. If you were uncertain about the intended meaning of any of them, please see descriptive text below each pictogram to see the meaning

19. How many of these pictograms are easy for you to understand?
All; Most; Only some

20. Have you ever seen pictograms routinely used in any pharmacy practice setting?
Y/N

21. If so, please describe: _____

22. Have you ever used pictograms in your practice?
*(For example this may include merely drawing your own pictures or shapes to illustrate an instruction or dosage)*
Y/N

23. If yes, please include a brief description: _____

## Section 3: Using pictograms in practice
## Please respond to all statements below by choosing one option on this 5-point Likert scale:

1-strongly disagree; 2-disagree; 3-neutral or unsure; 4-agree; 5-strongly agree

24. The design and overall "look" of these pictograms would make it easy for patients in South Africa to comprehend

25. The pictograms are able to communicate the core message clearly

26. I believe that pharmacists should routinely use pictograms

27. Current medicine labels provides adequate information for patients to ensure safe and appropriate medicine use (i.e. no need for any accompanying verbal or written information)

28. Pharmacist should always reinforce label information verbally

29. Most patients take the time to read the patient information section of the professional information leaflet (if available)

30. Including pictograms with written medicines information would make it easier for patients to comprehend

31. I believe pictograms should be used for ALL patient populations

32. Pictograms should be used ONLY for certain at-risk patient populations such as those with limited reading ability, limited education, inability to read English, impaired vision etc.

Pictograms should be used for:

- 33. dosage instructions Y/N
- 34. auxiliary or additional information Y/N
- 35. warnings Y/N
- 36. storage Y/N
- 37. side effects Y/N
- -38. indications Y/N
- -39. risk communication (e.g. risk of developing adverse effects to prescribed medication) Y/N
- -40. any others: Please describe_____

41. All medicine packaging (bottle, boxes, plastic bags etc) should include pictogram content

42. Pictograms should only appear on selected medicines

43. Patients would like to see pictograms being used on medicines and in information leaflets

44. All patients will appreciate having pictograms appear on their medicines or on patient information leaflets

45. Only certain patient groups are likely to appreciate having pictograms being used on medicines or on patient information leaflets

46. Patients would approve of pharmacists using pictograms for counselling

47. Do you have any additional negative or positive comments about using pictograms in practice?
Comment: _____

## Section 4: Attitude, intended behaviour and influencing factors relating to routine pictogram use in pharmacy

*IMPORTANT: Even if you do not interact directly with patients in your practice, we would really appreciate your opinion on the issues presented below. Your opinions would be analysed separately from those who do interact with patients.*

## Please respond to all statements below by choosing one option on this 5-point Likert scale:

1-strongly disagree; 2-disagree; 3-neutral or unsure; 4-agree; 5-strongly agree

48. The extra time taken to counsel patients with pictograms would be a deterrent to their use

49. My lack of knowledge about pictograms is a deterrent to incorporating them in my practice

50. I would require training to use pictograms when counselling patients

51. Incorporating pictograms in my practice would be expensive

52. Pictograms are too open to misinterpretation for safe use in routine practice

53. Incorporating pictograms in my practice would increase my workload

54. I am not in a position to unilaterally decide whether to incorporate pictograms into my practice as that decision would have to be made by management or other senior staff

55. Personally, I think that incorporating pictograms to counsel patients would be difficult

56. Using pictograms will give my practice a relative advantage compared to pharmacies that do not use pictograms

57. Introducing pictograms into my practice could work well with existing workflow processes and procedures

58. If I decided to include pictograms in my practice, I think my manager (or my organisation) would support the initiative

59. I am confident that I could counsel patients about their medicines using pictograms

60. Using pictograms during patient counselling would be easy at my practice site

61. Using pictograms to counsel patients will improve patients ability to recall medicine information

62. Using pictograms to counsel patients can help improve adherence

63. I believe it is a pharmacist's professional duty to use interventions such as pictograms as a communication tool to improve patient's comprehension and recall of medicines information

64. I would support a national initiative from the National Department of Health encouraging pharmacists to implement the use of pictograms in pharmacy

65. Generally, I think other pharmacists would be prepared to incorporate pictograms in their everyday practice

66. When it comes to using pictograms, I want my practice to align with the practice of most other pharmacists

67. When it comes to using pictograms, I will support whatever decision my manager (or my organisation) makes

68. If the South African Pharmacy Council recommended the use of pictograms in practice I would be more inclined to incorporate them into my practice

69. I hope to incorporate pictograms into my practice within the next year

70. Are you a pharmacist who is currently either using pictograms or keen to use pictograms in the future?

-Yes [ Jump to ADD-ON BRIEF SURVEY]

-No [ Jump to end of survey]

---

## ADD-ON BRIEF SURVEY

You have been identified as a pharmacist who is currently either using pictograms or is keen to use them in the future. If you choose to participate further, you would make a significant contribution to the findings of this project. This would contribute to a much broader global conversation about using pictograms in pharmacy, and South Africa could be key in driving that process. Please consider answering the questions below and providing us with your contact details.

We would like to try and learn more about how pharmacists regard pictograms and why they think pictograms might be useful. To do that, we would like to interview you at a later date. It will not take much time, and will be more like an informal chat. It will be done using either a direct phone call, Whatsapp call, zoom meeting, Skype etc. (whatever best suits you).

71. Would you be willing to have us contact you for an interview? (during 2021) Y/N

Contact details:

72. Name: _____
73. Email: _____
74. Cellphone: _____

75. Choose one option:
- I currently use pictograms in my practice and want to continue doing so
- I would like to start using pictograms in my practice

76. If you are using pictograms, could you please briefly describe them? For example, hand drawn, pre-printed on the bank bag, cartoon-type, stick figures and numbers etc
Comment: _____

77. If you are using pictograms, where did you get your pictograms from?
Comment: _____

# APPENDIX G

## SAPC APPROVAL OF PHARMACIST DETAILS WITH STIPULATIONS

**Prof Ros Dowse**
**Rhodes University**

r.hughes@ru.ac.za

South African Pharmacy Council

Registered Office
SAPC Building
591 Belvedere Street
Arcadia, Pretoria, 0083

Postal Address
Private Bag X40040
Arcadia, 0007

Telephone number
Switchboard
27 (12) 319 8500
Registrar
27 (12) 319 8501/8502

Fax
(27)12 326 1496

E-mail
Registrar@sapc.za.org

Website
www.sapc.za.org

| Our ref | Date |
|---|---|
| TA Masango | 21 October 2020 |

**Dear Prof Dowse**

**We acknowledge receipt of your email addressed to the South African Pharmacy Council (Council) requesting access to data held by the Council in respect of registeredpharmacists.**

**We confirm that you have made a formal request to the Council for access to the email addresses of all registered pharmacists in order to conduct research pertaining to a study that "aims to explore pharmacists' opinions of pictograms, how familiar they are with them, whether they currently use them or would like to use them in the future, andwhat issues might help them or act as a barrier to them doing so". We further confirm that such research is part of your Master's in pharmacy, which you are undertaking at Rhodes University and which research has been approved by the relevant ethics approval.**

**Kindly note that in providing you with access to the email addresses of all registered pharmacists, the following conduct must always be upheld when using such data:**

(a) The data provided may be used **only for the purpose of conducting the survey you have detailed in your request and may only be used by the researcher**;
(b) In the event that the data is used for any other purpose or such data is shared/used by any person other than the researcher, the Council will proceed with disciplinary action against the researcher and the Higher Education Institution (HEI) will be notified of such misconduct;
(c) The data provided to the researcher may not be sold to any third person, including but not limited to the HEI;
(d) The researcher, when using the data, being email addresses shall clearlyindicate that the survey is part of authorised and approved research;
(e) The researcher shall give the recipients of the email an option not to part of the research or to opt out of receiving any further communication as part of the research;
(f) The Council does not guarantee that the data provided is accurate or current, asregistered persons may change personal information with the Council at any time; and
(g) The researcher shall share with the South African Pharmacy Council, theoutcome of the research.

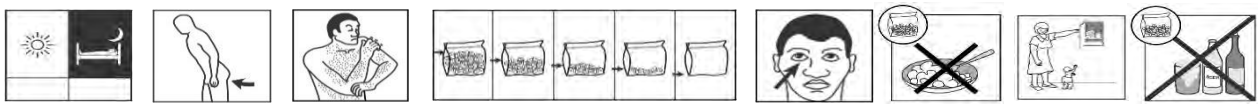
**The attached register of information is hereby provided as a once off provision of information as requested.**

**Yours faithfully**
**TA MASANGO REGISTRAR/CEO/dh**

ALL CORRESPONDENCE TO BE ADDRESSED TO THE REGISTRAR

# APPENDIX H

# PHASE 1 INVITATIONAL EMAIL



**Pharmacists' attitudes and perception of using pictograms as a communication tool in practice**

Dear Pharmacist

What do you and your fellow pharmacists think of using pictograms in pharmacy practice? Well, no-one yet knows the answer to that question as no previous research has ever been done that can answer that question. In addition, South African pictogram research is prominent globally and has been widely cited, so we are keen to also contribute to this aspect of pictogram-related research.

This is why we would like to invite you to take part in the research study: **"Pharmacists' attitudes and perception of using pictograms as a communication tool in practice"**.

The aim of this study is to explore your opinions of pictograms, how familiar you are with them, whether you currently use them or would like to use them in the future, and what issues might either help you, or act as a barrier, to you doing so.

- Data will be collected via an online survey
- The survey will take approximately 10-15 minutes (or less) of your time to complete
- Aside from giving up your time, we do not expect any risks or costs associated with taking part in the study
- Participation in this research is voluntary
- Your identity will be confidential
- If you agree to participate, your answers will be stored confidentially and anonymously
- The project has received institutional ethical approval
- You will receive feedback about the overall results of the study in the form of a one-page summary once the study has been completed

**TO PARTICIPATE IN THE SURVEY PLEASE CLICK ON THE LINK BELOW:**

**https://forms.gle/Hy5Cu4iNY7fZnvRt6**

The study is being conducted by the following investigators. If you require any further assistance, encounter any problems or wish to enquire further about this research, please contact:

**Postgraduate researcher:**
Mr Sam Okeyo
Email: g16o3289@campus.ru.ac.za
Tel: 072 292 2642

**Supervisor:**
Professor Ros Dowse
Email: r.dowse@ru.ac.za
Tel: 083 556 9796

# APPENDIX I
# PHASE 1 SURVEY INTRODUCTION STATEMENT

What do you and your fellow pharmacists think of using pictograms in pharmacy practice? Well, no-one yet knows the answer to that question as no previous research has ever been done that can answer that question. In addition, South African pictogram research is prominent globally and has been widely cited, so we are keen to also contribute to this aspect of pictogram-related research.

This is why we would like to invite you to take part in the research study: **"Pharmacists' attitudes and perception of using pictograms as a communication tool in practice"**.

The aim of this study is to explore your opinions of pictograms, how familiar you are with them, whether you currently use them or would like to use them in the future, and what issues might either help you, or act as a barrier, to you doing so.

- Data will be collected via an online survey
- The survey will take approximately 10-15 minutes (or less) of your time to complete
- Aside from giving up your time, we do not expect any risks or costs associated with taking part in the study
- Participation in this research is voluntary
- Your identity will be confidential
- If you agree to participate, your answers will be stored confidentially and anonymously
- The project has received institutional ethical approval
- You will receive feedback about the overall results of the study in the form of a one-page summary once the study has been completed

Contact details of the researchers appear below. If you require any further assistance, encounter any problems or wish to enquire further about this research, please contact:

MPharm candidate: Mr Sam Okeyo
Email: g16o3289@campus.ru.ac.za
Tel: 072 292 2642

Supervisor: Professor Ros Dowse
Email: r.dowse@ru.ac.za
Tel: 083 556 9796

**Consent Agreement**

All participants participating in the survey have the freedom to leave when they please and not face any repercussions for leaving. This is a voluntary process and all information gathered will be used for research purposes. The survey will be anonymous, therefore all participants are encouraged to be as honest as possible when answering the questions.

1. Do you give consent to participate in the study? Y/N

# APPENDIX J

# REMINDER EMAIL FOR PHASE 1 SURVEY

**Pharmacists' attitudes and perception of using pictograms as a communication tool in practice**

Dear Pharmacist

This serves as a friendly reminder to inform you that your participation in our research study entitled: **"Pharmacists' attitudes and perception of using pictograms as a communication tool in practice"** is needed. Kindly ignore this email if you have already accessed and answered our survey.

Pictograms are usually black and white graphic images that communicate information visually. In the pharmacy context, they can be used to convey information about taking medicines, what the medicine is for, side effects, precautions, safety warnings, storage. Simple, hand drawn pictures/images illustrating an instruction, or the dosage are also examples of pictograms. Rhodes University has, for many years, been involved with pictogram research, from designing new pictograms and testing them for comprehension, to comparing their interpretation with international pictograms, incorporating them into simple medicine information leaflets for conditions such as HIV and TB, and assessing their impact on the understanding of that information in a clinical setting.

However, as yet there has been no research conducted that specifically aims to find out what pharmacists think about pictograms and whether they are likely to use them. This study will hopefully provide some baseline evidence of the future intention of pharmacists to consider using pictograms, and to identify any pharmacists currently using pictograms.

We therefore invite you to take part in the research study: **"Pharmacists' attitudes and perception of using pictograms as a communication tool in practice"**. The aim of this study is to explore your opinions of pictograms, how familiar you are with them, whether you currently use them or would like to use them in the future, and what issues might either help you, or act as a barrier, to you doing so.

o This survey will take approximately 10-15 minutes to complete
o The project has been approved by the Rhodes University Human Ethics Committee (Approval reference: 2020-1643-4680)
o If you would like to receive feedback on the outcome of the study and its findings, please let us know and you will be emailed a one-page summary.

If you are a pharmacist who does not interact with patients we would still like your input in this research. The link for this survey will be online till the 21st of February 2021.

If you would like to know more about pictograms before completing the survey, Ros Dowse recently published a commentary titled: *Pharmacists, are words enough? The case for pictograms as a valuable communication tool* in the journal Research in Social and Administrative Pharmacy. It may be accessed via this link: https://doi.org/10.1016/j.sapharm.2020.10.013. If you are unable to access the paper, please email Ros Dowse for a copy.

**To participate in the survey please click on the link below:**

**https://forms.gle/Hy5Cu4iNY7fZnvRt6**

Contact details of the researchers appear below. If you require any further assistance, encounter any problems or wish to enquire further about this research, please contact:

MPharm candidate: Mr Sam Okeyo

Email: g16o3289@campus.ru.ac.za

Tel: 072 292 2642

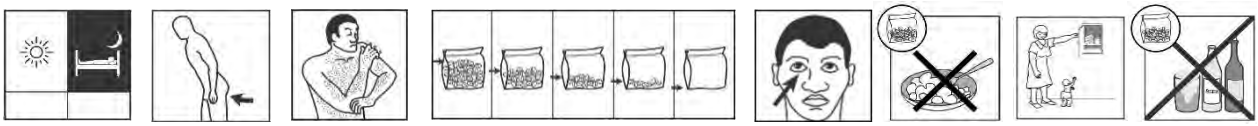
Supervisor: Professor Ros Dowse

Email: r.dowse@ru.ac.za

Tel: 083 556 9796

# APPENDIX K

## EMAIL TO RHODES PHARMACY ALUMNI FOR PHASE 1



**Pharmacists' attitudes and perception of using pictograms as a communication tool in practice**

Dear Rhodes pharmacy alumnus

If you are a pharmacist registered with the SAPC, you will have already received an email from us about a project called **"Pharmacists' attitudes and perception of using pictograms as a communication tool in practice"**.

This email is a special appeal from Ros Dowse and me (Sam, MPharm student) to you, fellow Rhodians, to help us increase the number of responses to the above survey. We are currently sitting at 372 (thank you if you are one of these), but we REALLY want to try and achieve 450, so every single additional response will be hugely appreciated!

I have appended the more detailed original email should you wish to re-read it

**Here is the link to the survey:**

**https://forms.gle/Hy5Cu4iNY7fZnvRt6**

Thank you in advance for your support

Warm regards.

Sam and Ros

**Postgraduate researcher:**
Mr Sam Okeyo
Email: g16o3289@campus.ru.ac.za
Tel: 072 292 2642

**Supervisor:**
Professor Ros Dowse
Email: r.dowse@ru.ac.za
Tel: 083 556 9796

# APPENDIX L

# HIGHER DEGREE COMMITTEE AMENDMENT APPROVAL

RHODES UNIVERSITY
*Where leaders learn*

Office
303, 3rd Floor,Chemical &
Pharmaceutical Sciences Building,

Artillery Rd,
Makhanda, 6139 PO Box 94,
Makhanda, 6140, South Africa

Tel: +27 (0) 46 603 8395

Email: s.burton@ru.ac.za

www.ru.ac.za

**Mr Sam Okeyo**
**Faculty of**
**Pharmacy**

**26 March 2021**

**Dear Sam**

**The Higher Degrees Committee for Pharmacy Practice proposals has noted and recommended approval of your request to amend the proposal of your MPharm study entitled: Pharmacist attitudes and perception of using pictograms as a communication tool in practice. The changes that have requested and approved are the change of Phase 2 of the study to a survey.**

**Wishing you all the best with the continuation of your study**

**Sincerely,**

**Susan Burton**
**Associate Professor – Pharmacy Practice**
**027-733556849**

# APPENDIX M

# ETHICAL STANDARD COMMITTEE AMMENDMENT APPROVAL


**Human Ethics Sub-Committee**
**Rhodes University Ethical Standards Committee**
PO Box 94, Makhanda, 6149 South Africa
Email: ethics-committee@ru.ac.za

**www.ru.ac.za/research/research/ethics**
**NHREC Registration No.REC 241114-045**

26th March 2021

Dear Sam Juma,

Supervisor: Prof. Ros Dowse

**Ethics approval number: 2020-1643-4680**

**Title: Pharmacists' attitudes and perception of using pictograms as a communication tool inpractice**

Congratulations on the remarkably successful completion of Phase 1 of your research. As the aimof the Phase 2 is not altered in any way other than through requesting feedback vie a second questionnaire to the types of questions you intended asking in the limited personal approach, I have no reason to withhold approval.

I am thus satisfied by the proposed adjustments suggested in your correspondence and grant you **approval** to progress with the research.

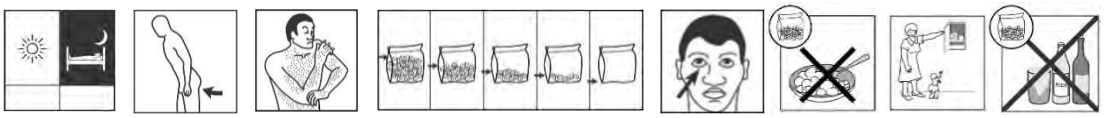
Sincerely,

**Prof Arthur Webb**

**Chair: Human Ethics sub-committee, RUSEC-HE**

# APPENDIX N

## PHASE 2 INVITATIONAL EMAIL



**Phase 2 survey:**
**Exploration of current and intended pharmacist behaviour relating to pictogram usage**

Dear Pharmacist

In Phase 1 of this study, you kindly completed the survey and also indicated that you would be available for a follow up interview. We had anticipated a limited response to this request, but a surprisingly high number of pharmacists indicated their interest. However, it would only have been possible to individually interview a limited number. We were so heartened with the excellent response that we wanted to ensure that everyone who had indicated their interest in the follow-up phase was included. We have therefore replaced the individual interviews with a follow-up online survey which is much shorter and more focused.

The aim of this Phase 2 survey is to develop a deeper insight into how you are either currently using pictograms or plan to use them in future practice, and how barriers identified in the Phase 1 survey influence your current or intended use of pictograms in practice.

- Data will be collected via an online survey
- The survey will take approximately 15 minutes of your time to complete
- Aside from giving up your time, we do not expect any risks or costs associated with taking part in the study
- Participation in this research is voluntary
- Your identity will be confidential
- If you agree to participate, your answers will be stored confidentially and anonymously
- The amendment to the project has been approved by the Rhodes University Human Ethics Committee (Approval reference: 2020-1643-4680)
- If you would like to receive feedback on the outcome of the study and its findings, please let us know and you will be emailed a one-page summary.

**TO PARTICIPATE IN THE SURVEY PLEASE CLICK ON THE LINK BELOW:**

**https://forms.gle/MAxgkDYsv21qDSVC8**

The study is being conducted by the following investigators. If you require any further assistance, encounter any problems or wish to enquire further about this research, please contact:

**MPharm candidate:**
Mr Sam Okeyo
Email: g16o3289@campus.ru.ac.za
Tel: 072 292 2642

**Supervisor:**
Professor Ros Dowse
Email: r.dowse@ru.ac.za
Tel: 083 556 9796

# APPENDIX O

# PHASE 2 INTRODUCTION STATEMENT

**THANK YOU** for completing the pictogram survey and for indicating that you would be available for a follow up interview. We had anticipated a limited response to this request, but a surprisingly high number of pharmacists indicated their interest. However, it would only have been possible to individually interview a limited number. We were so heartened with the excellent response that we wanted to ensure that everyone who had indicated their interest in the follow-up phase was included. We have therefore replaced the individual interviews with this follow-up online survey which is much shorter and more focused.

The aim of this follow-up survey is to develop a deeper insight into how you are either currently using pictograms or plan to use them in future practice, and how barriers identified in the original survey influence your current or intended use of pictograms in practice.

o The survey will take approximately 15 minutes of your time to complete
o The amendment to the project has been approved by the Rhodes University Human Ethics Committee (Approval reference: 2020-1643-4680)
o If you would like to receive feedback on the outcome of the study and its findings, please let us know and you will be emailed a one-page summary.

Contact details of the researchers appear below. If you require any further assistance, encounter any problems or wish to enquire further about this research, please contact:

MPharm candidate: Mr Sam Okeyo
Email: g16o3289@campus.ru.ac.za
Tel: 072 292 2642

Supervisor: Professor Ros Dowse
Email: r.dowse@ru.ac.za
Tel: 083 556 9796

# APPENDIX P

# PHASE 2 ONLINE SURVEY

## Consent Agreement

All participants participating in the survey have the freedom to leave when they please and not face any repercussions for leaving. This is a voluntary process and all information gathered will be used for research purposes. The survey will be anonymous, therefore all participants are encouraged to be as honest as possible when answering the questions.

1. Do you give consent to participate in the study?
-Yes
-No

## Your current practice

2. What is your current practice site?
[Community pharmacy-private, Community pharmacy-corporate, Hospital-public, Hospital -private, Primary care clinic, Medical aid industry, Pharmaceutical industry, Consultant pharmacist, Specialist pharmacy service, National/provincial department of health, Academia, other: _____]

3. Where is the location of your current practice site?
[Eastern cape, Free State, Gauteng, Kwazulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West, Western Cape, other: _____]

Number of people in the following positions in your pharmacy/organisation:

4. Pharmacists
5. Community service pharmacist
6. Pharmacy Interns
7. Pharmacy assistants
8. Front shop assistants

9. What position do you hold?
[Responsible pharmacist, Manager, Pharmacist, Part-time pharmacist, Locum, other: _____]

10. Please describe how you first became aware of pictograms

11. What stimulated your interest and desire to work with pictograms?

12. Choose one option:

- I currently use pictograms [jump to Question 13]
- I would like to start using pictograms in the future [jump to Question 44]

## PHARMACISTS CURRENTLY USING PICTOGRAMS

In this section we would like to read about your experience with introducing pictograms. We have included questions that have options for you to choose from, but what is really important is the comment section below each question for you to give a detailed response. It's only through reading about your experiences that we will gain deeper insight into your practice with pictograms.

13. Did you initiate the process of using pictograms alone or with other pharmacists in your workplace?
[Alone; With pharmacist colleagues]

14. Please elaborate: _____

15. Did you collaborate with any other health professionals apart from pharmacists?
[Nurse; Doctor; N/A; other_____]

16. Where do you source your pictograms?
[USP pictograms; FIP pictograms; sourced online; hand drawn by self; hand drawn by others; other_____]

17. Was the initiative supported by your manager/supervisor in the pharmacy?
[Yes; No; N/A]

18. Please elaborate: _____

19. Were you supported by pharmacists from elsewhere with implementing pictograms (for example pharmacists in your local SAAHIP branch, in academia, at another hospital/clinic etc.)?
[Yes, No]

20. Please elaborate: _____

21. On a scale of 1 – 7 how difficult was it to introduce pictograms at your practice site?
[1= very difficult; 2= difficult; 3=somewhat difficult; 4= moderate; 5= somewhat easy; 6=easy; 7=very easy]
[1; 2; 3; 4; 5; 6; 7]

22. Please elaborate: _____

23. How would you rate the **HEALTH LITERACY** of your average patient at your current practice site? Health literacy is the ability to access, understand, integrate and apply information to maintain or improve your health.
[Poor; Moderate; Good]

24. Please elaborate: _____

25. Have any of your patients commented on the use of pictograms?
[Yes; No; Unsure]

26. Please elaborate: _____

27. How have most patients reacted to having pictograms on their medicine?
[Positive; Neutral; Negative]

28. Please elaborate: _____

29. Have any patients complained about having pictograms on their medicine?
[Yes; No]

30. Please elaborate: _____

31. Do you think the pictograms have a positive effect on your communication with patients?
[Yes; No]

32. Please elaborate: _____

33. Have you experienced any negative aspects of using pictograms?
[Yes; No]

34. Please elaborate: _____

The findings from the first survey indicated that lack of control over making the decision to implement pictograms appeared to present the greatest barrier.

35. Was this the most challenging barrier for you in implementing the pictograms in your workplace?
[Yes; No; Maybe]

36. Please elaborate: _____

37. Can you offer any insight as to how you overcame this barrier?

38. Do you have any advice for other pharmacists who want to implement pictograms in overcoming the lack of control barrier?

The next 3 barriers most commonly identified in the first survey were cost, increased workload and pictogram misinterpretation. On a scale of 1 – 4 how would you rate the magnitude of these as they relate to your current use of pictograms in practice.
[1=Highly significant; 2= somewhat significant; 3= not particularly significant; 4= of no significance at all]

39. Cost
40. Increased workload
41. Pictogram misinterpretation

42. Please include any additional information about your experience with these three barriers (cost, increased workload and pictogram misinterpretation)

**43. Any concluding comments, observations or suggestions for other pharmacists would be highly valued!**

## PHARMACISTS THINKING OF USING PICTOGRAMS IN THE FUTURE

In this section we are interested in finding out about your possible intention to start implementing pictograms. We have included questions that have options for you to choose from, but what is really important is the comment section below each question for you to give a detailed response. It's only through reading about your perspective that we will gain deeper insight into your possible intention to start implementing pictograms.

44. Do you know any pharmacists who are using pictograms in their practice?
[Yes; No]

45. Please elaborate: _____

46. Do you think other pharmacists in your workplace would support the idea of using pictograms?
[Yes; No; Maybe]

47. Please elaborate: _____

48. Do you think your manager/supervisor would support the idea of using pictograms?
[Yes; No; Maybe]

49. Please elaborate: _____

50. How would you rate the **HEALTH LITERACY** of your average patient at your current practice site? Health literacy is the ability to access, understand, integrate and apply information to maintain or improve your health.
[Poor; Moderate; Good]

51. Please elaborate: _____

52. For patients with high health literacy skills would you use pictograms on their medicine?
[Yes; No; Maybe]

53. Please elaborate: _____

54. Do you think most patients will be receptive to having pictograms on their medicine?
[Yes; No; Maybe]

55. Please elaborate: _____

56. Are there any benefits you foresee using pictograms?
[Yes; No; Maybe]

57. Please elaborate: _____

The findings from the first survey indicated that lack of control over making the decision to implement pictograms appeared to present the greatest barrier.

58. Do you personally consider this to be the most challenging barrier in your workplace?
[Yes; No; Maybe]

59. Please elaborate: _____

60. Can you offer any insight as to how you plan to overcome this barrier in your workplace?
[Yes; No]

61. Please elaborate: _____

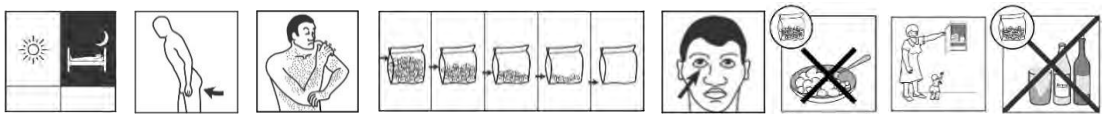
The next 3 barriers most commonly identified in the first survey were cost, increased workload and pictogram misinterpretation. On a scale of 1 – 4 how would you rate the magnitude of these barriers in implementing pictograms.
[1=Highly significant; 2= somewhat significant; 3= not particularly significant; 4= of no significance at all]

62. Cost
63. Increased workload
64. Pictogram misinterpretation

**65. Any concluding comments, observations or suggestions would be highly valued!**

# APPENDIX Q

# REMIDER EMAIL FOR PHASE 2 SURVEY



**Phase 2 survey:**
**Exploration of current and intended pharmacist behaviour relating to pictogram usage**

Dear Pharmacist

You may have already completed this follow up survey and a big **THANK YOU** for that.

If you have not done so, we appeal to you to consider completing the survey as we need the opinion of as many pharmacists as possible to draw conclusions that are truly representative of the pharmacy profession.

A reminder that the aim of this follow up survey is to develop a deeper insight into how you are using pictograms/plan to use them in the future, and to identify barriers that will influence this process.

**ALTERNATIVELY**, if you have no desire to complete another survey, we would like to offer you the option of a short conversation using either Whatsapp, Skype, Zoom etc. We hope that this makes it easier for you to participate. The conversation will be recorded.

- The survey will take approximately 15 minutes of your time to complete
- The amendment to the project has been approved by the Rhodes University Human Ethics Committee (Approval reference: 2020-1643-4680)
- If you would like to receive feedback on the outcome of the study and its findings, please let us know and you will be emailed a one-page summary.

**TO PARTICIPATE IN THE SURVEY PLEASE CLICK ON THE LINK BELOW:**

**https://forms.gle/MAxgkDYsv21qDSVC8**

The study is being conducted by the following investigators. If you require any further assistance, encounter any problems or wish to enquire further about this research, please contact:

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