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REVIEW

The Amsler Grid in Everyday Practice: A Review of Its Role and Limitations in Primary Care

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Abstract: This narrative review provides a comprehensive overview of current evidence on the use of the Amsler grid as a simple and cost-effective tool for detecting central visual field defects, particularly in macular disorders such as age-related macular degeneration (AMD). Despite the availability of advanced imaging techniques like optical coherence tomography (OCT), the grid remains valuable in primary care and home monitoring due to its accessibility and ease of use. This review includes studies evaluating its diagnostic performance, clinical applications, and recent digital adaptations, with a focus on early detection and patient self-monitoring. It facilitates early detection of visual disturbances, enabling timely diagnosis and intervention. The test is applicable in various retinal conditions, including AMD, diabetic macular edema, central serous chorioretinopathy, and epiretinal membrane. Although its diagnostic accuracy varies depending on the condition and stage, clinical studies support its reliability as an adjunctive tool in everyday practice. Recent developments include mobile and web-based platforms, as well as integration with artificial intelligence, which may enhance diagnostic accuracy, enable longitudinal monitoring, and improve patient adherence. Early detection is crucial for preserving vision and reducing the global burden of visual impairment.

Keywords: Amsler grid, macular disorders, visual field defects, central age-related macular degeneration, primary care screening, self-monitoring

Introduction

The Amsler grid, a simple yet highly effective diagnostic tool, has long been used to identify abnormalities in the central visual field, such as scotomas and metamorphopsia.[1,2] It was designed to analyze visual field defects within the central 10 degrees around the fixation point.[3] Developed by Marc Amsler in the mid-20th century, the grid has become an established component of routine ophthalmologic examinations. Although advanced imaging techniques such as optical coherence tomography (OCT) have significantly advanced macular diagnostics, the Amsler test remains one of the essential tools.[4–6]

The Amsler grid consists of horizontal and vertical lines intersecting at a central fixation point. It targets the macula, the part of the retina responsible for sharp, detailed vision.[7] Patients taking the test focus on the central point and evaluate the surrounding lines for irregularities such as waviness, blurring, or gaps, which may indicate macular pathology.[8] Various macular disorders and other ocular conditions commonly produce such distortions, making the grid a valuable tool for initial screening and ongoing monitoring.[9–12]

Quick and effective diagnosis plays a key role in the everyday practice of primary care physicians. Among the tools supporting the diagnosis of ocular diseases, the Amsler test offers a simple, quick and cost-effective method for the detection of early symptoms of macular disorders. It is a simple, quick, and cost-effective diagnostic tool that allows for the detection of various macular conditions and can support primary care physicians in the early diagnosis of visual

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disorders, with reported specificity as high as 99% when performed on healthy control participants.[13,14] Its simplicity, accessibility, and relative effectiveness may also make it suitable for at-home use by patients affected by macular disorders.[15] For example, a national study conducted in Bhutan reported that 44.9% of AMD patients presented with late-stage disease at their first consultation, and nearly 30% had developed disciform scars. Regular home monitoring with the Amsler grid could have facilitated earlier detection and intervention, potentially preventing irreversible vision loss from such advanced pathology.[16]

Although originally intended for use in clinical settings, the Amsler grid has proven highly adaptable for home monitoring. Its portability and ease of use enable patients to participate actively in the management of their ocular health, allowing earlier detection of disease progression and more timely medical intervention.[17,18] Recent advancements, including digital versions of the grid and integration with artificial intelligence, have expanded its utility by enhancing accuracy and accessibility while addressing limitations such as variability in patient self-reporting. Early detection of macular disorders is critical to preserving vision and preventing irreversible visual impairment.[19,20]

The primary objective of this study is to assess the relevance and applicability of the Amsler grid as a diagnostic and screening instrument for macular disorders in the context of primary care. By critically analyzing its diagnostic performance, accessibility, and potential for integration with modern technologies, this work aims to evaluate the test's utility as a practical, low-cost tool for early identification of visual impairments in general practice, where access to specialized ophthalmologic diagnostics is often limited.

Materials and Methods

A narrative literature review was performed to evaluate the current role of the Amsler grid in detecting and monitoring macular disorders, with emphasis on its use in primary care and self-monitoring. The search was conducted in PubMed, Scopus, and Web of Science between January and March 2025.

The search terms combined controlled vocabulary (MeSH/Emtree) and free-text keywords: ("Amsler grid" OR "Amsler test") AND ("macular disease" OR "macular disorder" OR "age-related macular degeneration" OR "diabetic macular edema" OR "central serous chorioretinopathy" OR "epiretinal membrane" OR "visual field defect" OR "self-monitoring" OR "primary care"). Boolean operators AND/OR were used, and filters were applied to include only human studies published between January 2006 and March 2025. No language restrictions were applied.

Two reviewers independently screened titles and abstracts for relevance. Full-text articles were retrieved if they met inclusion criteria: (1) original clinical study or high-quality review addressing the Amsler grid's diagnostic performance, clinical application, or comparison with other diagnostic tools; (2) involvement of patients with confirmed macular disease or other central visual field defects; (3) clear outcome measures such as sensitivity, specificity, predictive values, or qualitative assessment of metamorphopsia. Exclusion criteria: editorials, conference abstracts without full data, animal studies.

Studies were considered high quality if published in peer-reviewed journals with a clear methodology and adequate sample size (≥10 participants). Relevance was defined as direct evaluation of the Amsler grid in a clinical or home-monitoring setting, or its integration into digital platforms.

The studies that met the inclusion criteria and were analyzed are presented in Table 1.

How to Perform Amsler Grid Test

The Amsler grid test is a simple, quick procedure that can be performed during a routine checkup by a primary care physician or independently at home by a patient who has been trained in its proper execution. The Amsler grid is a 10×10 cm grid consisting of intersecting horizontal and vertical lines, forming 0.5 cm x 0.5 cm squares. Standardized versions of the grid are available in print or as pre-designed testing charts.[30,31]

Prior to conducting the test, it is imperative to correct the patient's near refractive defect by using corrective eyewear typically employed for reading purposes. It is imperative to maintain the grid at a reading distance. Covering one eye during the procedure is essential, as the test must be performed separately for each eye. The patient is instructed to fixate the eyes on the central point of the grid.[21] In patients with difficulty maintaining fixation, the eye should be directed to the center of the grid so that all four corners are visible simultaneously. Looking at the central point, the patient assesses

Table 1 Characteristics of Included Studies

Author (Year)	Country	Design	Setting	Population (N, Diagnosis)	Comparator	Main Outcomes
Pandey et al (2016)[2]	India	Cross-sectional diagnostic study	Ophthalmology clinic	50 patients acquired macular disorders	Fundus exam	Amsler detected metamorphopsia and scotomas in multiple macular pathologies
Gessesse et al (2020)[3]	Ethiopia	Cross-sectional diagnostic accuracy study	Tertiary hospital	106 eyes, confirmed glaucoma	10-2 perimetry	Specificity 92%, Positive Predictive Value 97%, sensitivity increased with disease severity
Pondorfer et al (2020)[6]	Germany	Cross-sectional diagnostic study	Ophthalmology clinic	62 patients	Other visual function tests	Amsler sensitive for functional vision loss detection in iAMD
Diab et al (2015)[8]	Egypt	Observational clinical study	Ophthalmology clinic	50 patients with macular diseases	Clinical diagnosis	Demonstrated utility of Amsler in early AMD detection
Kalinowska et al (2018)[10]	Poland	Observational correlational study	Clinic	64 eyes included in the study: 30 eyes with DME, 22 eyes with diabetes without DME, and 12 eyes of normal subjects	OCT	Metamorphopsia score correlated with Amsler grid findings
Suwal et al (2024)[11]	Nepal	Cross-sectional diagnostic study	Hospital	38 patients with resolved CSCR	M-CHARTS, OCT	Amsler less sensitive than M-CHARTS for metamorphopsia
Herse (2013)[12]	Australia	Case report	Optometry clinic	Single patient	MRI, clinical exam	Incidental detection of hemianopia on Amsler grid (anecdotal)
Schmid et al (2018)[17]	Switzerland	Diagnostic case-control study	Clinic + self-monitoring	37 eyes	OCT	Moderate accuracy for self-monitoring AMD progression
Dave et al (2024)[18]	UK	Qualitative focus group study	Community + hospital	8 patients	—	Patient-reported utility and limitations of home monitoring with Amsler
Khurana et al (2021)[19]	USA	Prospective feasibility study	Multicenter	108 patients	Smartphone app	Digital Amsler feasible, good adherence rates
Gbadegesin et al (2023)[21]	Nigeria	Cross-sectional diagnostic study	Clinic	150 patients	10-2 perimetry	Moderate agreement between Amsler and perimetry results
Boon et al (2024)[22]	Singapore	Comparative diagnostic study	Clinic + app-based	127 eyes	Conventional Amsler	Digital Amsler comparable in accuracy, improved adherence
Arndt et al (2007)[23]	France	Prospective interventional study	Clinic	104 patients	OCT, surgery outcomes	Metamorphopsia improved post-surgery, measurable with Amsler
Hayreh et al (2008)[24]	USA	Prospective observational study	Clinic	386 eyes	Clinical visual outcomes	Amsler detected altitudinal defects in some cases
Su et al (2016)[25]	USA	Prospective cross-sectional	Tertiary ophthalmology clinic	53 patients with glaucoma	Humphrey 10-2	Spec. 92%, PPV 97%, sensitivity increased with severity
Loewenstein et al (2010)[26]	Israel + multicenter	Multicenter diagnostic study	Multicenter ophthalmology clinics	66 eyes with CNV and 65 eyes with intermediate AMD	PHP home device	PHP superior in early CNV; Amsler complementary
Klatt et al (2006)[27]	Germany	Diagnostic accuracy study	Ophthalmology clinic	147 patients (AMD, CNV, ERM, MH, CSCR)	PHP	Sens. 71–100% depending on condition; PHP > Amsler only in occult CNV
Kampmeier et al (2006)[28]	Germany	Diagnostic comparative study	Ophthalmology clinic	140 patients AMD	PHP	Comparable efficacy in early AMD; Amsler higher false positives
Üşümüş et al (2024)[29]	Turkey	Cross-sectional screening study	Primary care clinic	355 patients ≥50 years old, asymptomatic	OCT	Sens. 62.7%, Spec. 81.3%, NPV 86.3%, 9.57% asymptomatic lesions detected

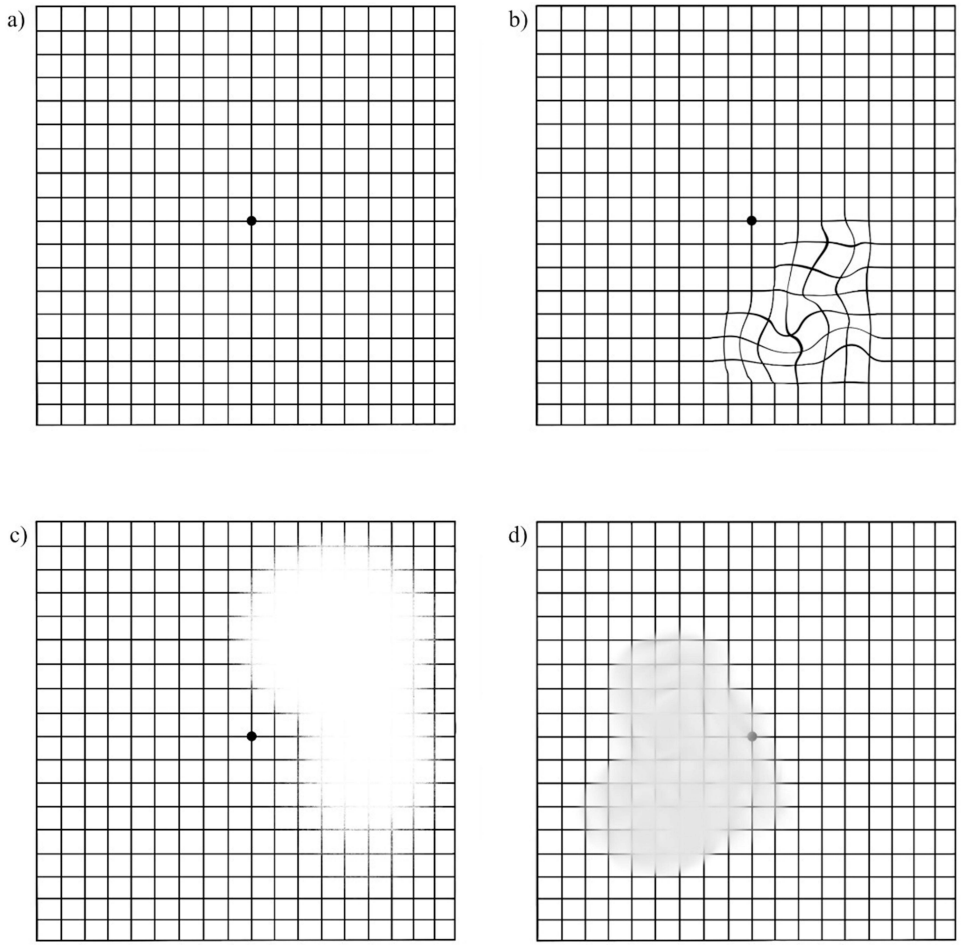

Figure 1 Possible outcomes of the Amsler grid test: (**a**) normal perception with a correct grid; (**b**) metamorphopsia (wavy or distorted lines); (**c**) scotomas or invisible areas within the visual field; (**d**) blurred or faded lines of the grid.

whether the lines are parallel or show distortion (metamorphopsia). Any small squares that are invisible or blurred should also be noted. The possible outcomes of the Amsler test, as previously described, are presented in Figure 1.

Areas of abnormality should be marked on the grid to allow later comparison to assess progress, stabilization, or improvement. In the case of invisible corners, diseases such as glaucoma or retinitis pigmentosa should be ruled out.[4,32] With a reading distance of approximately 33 cm, Amsler grid enables assessment of the central 20° of the visual field (10° in each direction from the fixation point). With 20 squares on each side, each square corresponds to roughly 1° of the visual field. Therefore, any distortion or missing parts on the grid are considered an indication of macular problems. These symptoms indicate the need to refer the patient to an ophthalmologist, especially in cases of new and recurrent disease.[22,32]

Conditions Detected and Epidemiology

The Amsler test is a valuable tool for the detection of various ophthalmic conditions. It is particularly effective in identifying central visual disturbances associated with diseases such as AMD, diabetic macular edema, central serous chorioretinopathy (CSCR), acute macular neuroretinopathy, epiretinal membrane (ERM) and other vitreoretinal interface diseases. It is also used in diagnostics cystoid macular edema which may result from diabetic maculopathy, retinal vein occlusion, intermediate uveitis and other conditions. Additionally in cases of non-arteritic anterior ischemic optic neuropathy, the Amsler grid can reveal altitudinal field defects.[23,24,32–34] The Amsler test can be used to screen for

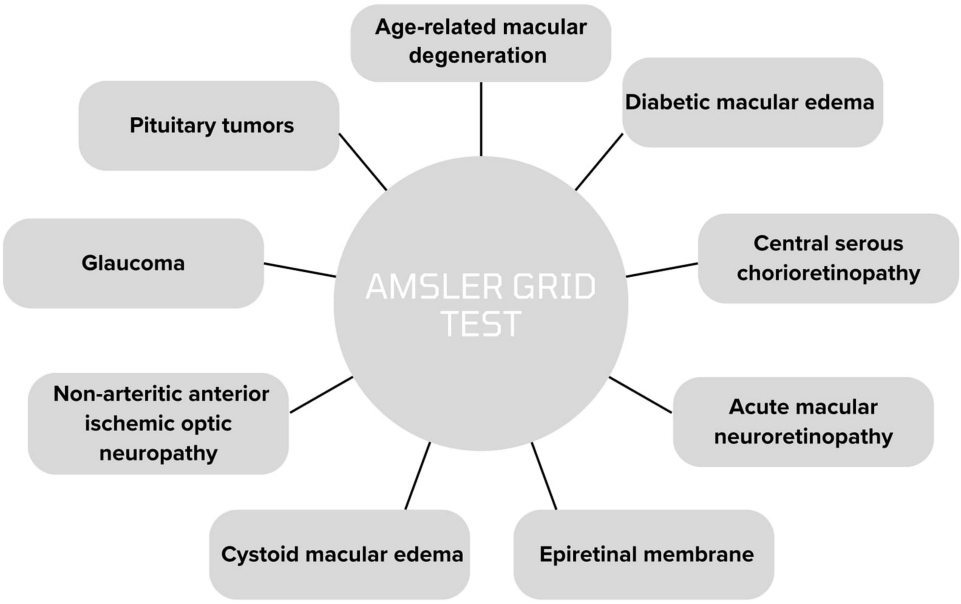

Figure 2 Conditions detected by the Amsler grid test.
Abbreviations: AMD, age-related macular degeneration; CSCR, central serous chorioretinopathy; ERM, epiretinal membrane.

moderate to severe central vision loss from glaucoma in patients with an established diagnosis, particularly in specialist care settings.[25] A single published case report has described incidental recognition of bitemporal hemianopia due to a pituitary tumor using the Amsler grid; the grid revealed the characteristic defect in that patient, but evidence is limited to this one report.[12] Moreover, it can be employed as a macular function test prior to cataract surgery.[33] The conditions identified by the Amsler test are illustrated in Figure 2.

AMD is an increasing problem in society due to aging and increased longevity. It is estimated that it affects 196 million people around the world. AMD has an annual incidence ranging from 0.3 per 1000 in people aged 55 to 59 years to 36.7 per 1000 in people aged 90 years and older.[7] The number of people suffering from this disease is expected to increase to 288 million in 2040.[8] This condition represents the leading cause of blindness in developed countries and accounts for up to 8.7% of all cases of blindness worldwide. Therefore, early diagnosis may be crucial for the patient's future quality of life.[9] CSCR is a vision-threatening retinopathy. It occurs 6 times more often in men than in women. The annual incidence is approximately 10 per 100,000 people for men and 1.7 for women.[10] ERM is a comparatively common macular disease. The incidence increases with age from 1.9% in people <60 years of age, to 7.2% in people aged 60–69 years to 11.6% in people aged 70–79 years.[11] Given the frequency and often insidious onset of these macular conditions, they may initially present in primary care settings. This underscores the pivotal role of general practitioners in early detection and timely referral to ophthalmology specialists.

Diagnostic Accuracy

The diagnosis of macular diseases is predominantly based on advanced imaging modalities, including OCT, Fundus Fluorescein Angiography (FFA), and PHP. These techniques are considered the gold standard due to their ability to provide detailed visualization of retinal and macular structures.[26,35,36] However, their reliance on specialized equipment and trained personnel may limit their accessibility in certain healthcare settings. Under such conditions, the Amsler grid may serve as a complementary method for the early detection and ongoing observation of macular abnormalities, particularly in resource-limited environments or in the context of patient-led self-monitoring.[37]

Su et al conducted a prospective, cross-sectional study evaluating the diagnostic utility of the Amsler grid in detecting central visual field defects in patients with glaucoma The study involved 53 individuals (106 eyes) with confirmed

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glaucoma, all of whom underwent both the Amsler grid test and the Humphrey 10–2 visual field assessment, which served as the reference method. The Amsler test was considered abnormal when participants reported missing, blurred, or distorted lines within the central 10° of vision. Results showed high specificity (92%) and a strong positive predictive value (97%) for detecting central deficits. Sensitivity increased with disease severity, measured by mean deviation (MD): 40% in mild cases (MD > –6 dB), 58% in moderate (–6 to –12 dB), and 92% in severe cases (MD < –12 dB). A significant correlation was found between the extent of abnormalities on the Amsler grid and 10–2 test parameters, indicating the grid may be useful for both initial evaluation and monitoring disease progression.[25]

A research team from the University Eye Clinics in Kiel and Regensburg conducted a study comparing the diagnostic performance of the Amsler grid test and PHP in detecting metamorphopsia in patients with various macular disorders. The study included 147 patients (153 eyes) diagnosed with classic and occult choroidal neovascularization (CNV), intermediate AMD (iAMD), macular hole (MH), CSCR, and ERM. The analysis showed that the Amsler test demonstrated very high sensitivity ranging from 71% to 100%, depending on the condition. Sensitivity reached 100% in cases of iAMD, ERM, and MH; 94% in classic CNV and 73% in CSR. Only in patients with occult CNV did the preview PHP show superior sensitivity (89%) compared to the Amsler grid (71%), a difference that was statistically significant ($p = 0.046$). In all other diagnostic groups, the Amsler grid was comparable or outperformed PHP, while maintaining its simplicity, low cost, and clinical applicability in routine ophthalmic care.[27]

The study, conducted by Kampmeier et al of the University Ophthalmology Clinic in Ulm, aimed to compare the effectiveness of the Amsler test and the PHP test in detecting metamorphopsia and dark circles in different stages of AMD. The study encompassed 140 patients ranging in age range from 50 to 90, of whom 95 were diagnosed with the non-ischemic form and 45 with the neovascular (exudative) form of AMD. The Amsler test demonstrated equivalent efficacy to the PHP test in detecting early-stage AMD (30%) and late-stage lesions with retinal pigment epithelium atrophy (52% Amsler vs 46% PHP). In cases of geographic atrophy, the Amsler test demonstrated a sensitivity of 67%, while in cases of exudative (neovascular) AMD, it reached 80%, which is only slightly lower than the 84% sensitivity of the PHP test. However, in a control group of healthy volunteers, the Amsler test exhibited a higher percentage of false positives (15%) compared to the PHP test (3%). Nevertheless, the Amsler grid remains a readily available, inexpensive, and widely used method that allows patients to perform the test themselves at home. Despite its reduced sensitivity in cases of geographic atrophy and neovascular AMD, the Amsler test remains a practical and useful diagnostic instrument in the daily care of patients with AMD.[28]

Although the Amsler grid does not match the diagnostic precision of advanced imaging techniques, its simplicity and ease of use continue to make it a practical tool for initial screening, especially in settings where resources are limited. With further development, it has the potential to become a more effective part of routine eye care and early intervention strategies.

Amsler Grid for Macular Screening in Primary Care

In the primary care setting, the early detection of macular diseases can be hindered by restricted access to specialized diagnostic tests. In this context, the Amsler test remains a potentially useful screening tool, particularly because of its simplicity, low cost, and ability to be rapidly implemented in family physicians' offices.[14]

A cross-sectional study conducted by Kuzucu Üşümüş et al evaluated the usefulness of using the Amsler test in a primary care setting. The study population comprised 355 adult patients (a total of 700 eyes) over the age of 50 who reported no ocular symptoms and had no previous diagnosis of AMD. The results of the Amsler test were then compared with those of a comprehensive ophthalmological examination, which included OCT evaluation. OCT was regarded as the reference method for diagnosing retinal diseases. In the context of statistical analysis, the Amsler test demonstrated a sensitivity of 62.7%, a specificity of 81.3%, a positive predictive value of 54.5%, a negative predictive value of 86.3%, and an overall diagnostic accuracy of 73.7%. While the predictive values were moderate in a population context, the results confirmed the usefulness of the Amsler test as a screening tool that can assist in the early selection of patients requiring further specialized diagnosis. A notable finding is the detection of previously undiagnosed retinal lesions, which remained asymptomatic, in 9.57% of the examined eyes.[29]

This observation underscores the potential of the Amsler test as a preliminary screening instrument in primary care settings. However, the necessity for additional large-scale studies is evident to substantiate its efficacy and to refine its incorporation into standard clinical practice.

Importance of Early Detection

Early detection of AMD is crucial for preserving vision and enhancing the quality of life. Timely identification allows for interventions that can slow disease progression and maintain visual function. A study has shown that early diagnosis, combined with effective communication of prognosis and ongoing support, can significantly improve the quality of life for individuals with macular degeneration.[38]

Research highlights the importance of early intervention in slowing AMD's progression.[39] For example, patients diagnosed at an early stage have more treatment options, including lifestyle adjustments like smoking cessation, dietary supplementation with antioxidants, and regular monitoring to detect disease progression before it causes irreversible damage.[40,41] Early detection also allows for the timely initiation of advanced therapies, such as anti-vascular endothelial growth factor (anti-VEGF) injections for wet AMD. These treatments are most effective when started promptly, often preventing severe vision loss and improving long-term visual outcomes.[42]

In addition to medical benefits, early diagnosis contributes to the psychological and emotional well-being of patients.[43] It allows individuals to understand their prognosis, prepare for potential changes in vision, and seek appropriate support services. A study has demonstrated that early diagnosis, combined with effective communication from healthcare professionals, improves patients' ability to adapt and maintain independence, thereby enhancing their overall quality of life.[44] Moreover, routine screening and awareness campaigns targeting high-risk populations, such as older adults and individuals with a family history of AMD can help reduce the global burden of visual impairment caused by AMD.[45] Early detection of AMD plays a critical role in preserving vision, enhancing quality of life, and offering patients a chance to take advantage of existing therapies before significant vision loss occurs. It underscores the need for regular eye examinations, public health initiatives to raise awareness, and advancements in screening technologies to facilitate earlier and more accurate diagnosis.[46]

Future Directions

Ongoing advancements in ophthalmology continue to prioritize early detection, patient autonomy, and the integration of technology into clinical workflows. Within this evolving framework, the Amsler grid, despite its structural simplicity, remains a promising tool whose core principles are now being actively re-engineered into next-generation, software-based tools.[22] Current trends in telemedicine, digital health innovation, and personalized monitoring strongly support the adaptation from the traditional paper format toward fully digital, data-driven solutions.[47] Recent developments have increasingly replaced the paper grid by converting its principles into an intelligent, app-based solution featuring standardized administration, real-time data collection, and enhanced patient adherence.[22,48] Examples include mobile applications such as Alleye®, Amsler Grid App® and FoveApp®, which incorporate reminder systems and secure data storage. This shift represents an evolution rather than a simple extension, as digital tools enable functionalities such as automated data archiving, longitudinal tracking of changes, and integration with remote care systems — capabilities that are not possible with the traditional paper version. However, these applications are intended solely for monitoring purposes in consultation with a healthcare professional, and any suspected abnormalities should prompt formal diagnostic evaluation by an ophthalmologist before a diagnosis is established. When integrated into digital health ecosystems, the Amsler grid can provide remote surveillance, long-term tracking of disease progression, and earlier therapeutic intervention.[47] In combination with artificial intelligence and clinical oversight, such tools can overcome existing limitations in sensitivity and the subjectivity of patient self-reporting that are inherent to the paper-based test.[49] Incorporating digital Amsler testing into multimodal diagnostic frameworks could support the development of effective home monitoring strategies for macular disorders, facilitating better clinical management and ultimately improving patients' quality of life.[50] As modern ophthalmology shifts toward patient-centered and technology-enhanced care models, optimizing user training and visual literacy will be essential to ensure consistent and accurate test performance across these new digital platforms.[47,51]

Key areas for future development include:

(1) Digital Integration: Advancements in digital health could enhance the Amsler grid's utility. A study evaluating a digital version of the Amsler grid demonstrated comparable accuracy to the conventional test, suggesting that digital platforms could improve accessibility and user engagement.[22]
(2) Enhanced Training and Education: Ensuring that patients are well-informed and properly trained in using the Amsler grid is crucial. Comprehensive patient education is essential to improve the effectiveness of self-monitoring tools.[47]
(3) Complementary Screening Tools: By integrating the Amsler grid with advanced diagnostic techniques, such as OCT or FA, early detection and ongoing monitoring of AMD could be enhanced, offering a more thorough evaluation of the patient's condition.[52]
(4) Emerging VR-based Technologies: Emerging VR-based technologies may offer new approaches to simplify visual field assessments, improve the repeatability of testing, and enable more consistent comparison of results within the same patient over time and between different patient groups.[53] These methods could also support monitoring of disease progression associated with aging and other temporal changes, although their reliability and clinical utility remain to be established. Additionally, multimodal concepts that combine digital Amsler testing with other diagnostic measures, such as intraocular pressure assessment, contrast sensitivity testing, or color vision evaluation, may help expand screening strategies within macular disease management while exploring potential secondary benefits for conditions like glaucoma and optic neuropathies.

Discussion

The Amsler grid, despite being a decades-old tool, continues to hold relevance in modern ophthalmic practice, especially in contexts where access to advanced diagnostics is limited. Its primary advantages include simplicity, low cost, portability, and the ability to be self-administered by patients.[14,15,22] Studies confirm that the grid can detect a range of macular pathologies, including AMD, CSCR, and ERM, with varying levels of sensitivity depending on disease type and stage.[25,27,28] The ease of use and minimal training requirements make it an attractive option for both clinical settings and home monitoring, potentially facilitating earlier detection of disease progression and timelier specialist referral.

However, the diagnostic accuracy of the Amsler grid remains a significant limitation when compared with advanced imaging techniques such as OCT, FFA, or PHP.[26,35,36] Although some studies have demonstrated high specificity (92%) and positive predictive value (97%) for certain conditions such as glaucoma-related central visual field defects, the sensitivity for early-stage disease remains suboptimal, as low as 40% in mild cases.[25] In AMD, the grid may fail to detect subtle changes, particularly in geographic atrophy or occult choroidal neovascularization, where alternative tests like PHP have shown higher sensitivity.[27,28] Additionally, the test relies heavily on subjective patient reporting, which can be influenced by individual perception, understanding of instructions, and even cognitive factors. This subjectivity may lead to both false positives and false negatives, as observed in higher rates of false-positive results in healthy controls.[28]

From a public health and community perspective, the Amsler grid could serve as a low-barrier screening option, particularly in primary care and underserved areas. For instance, the Bhutan study[16] highlights the potential missed opportunities when patients present at late stages of AMD, that could potentially have been prevented through regular self-monitoring. Implementing structured community-based screening programs that distribute Amsler grids, along with targeted education campaigns for high-risk groups (eg, older adults, patients with family history of AMD), could significantly enhance early detection rates. Such interventions should be paired with clear referral pathways to ensure that abnormal findings are promptly evaluated by ophthalmologists.

Critical evaluation of existing literature reveals that many studies assessing the Amsler grid's utility are limited by relatively small sample sizes, heterogeneous patient populations, and variable testing protocols.[25,27,28] Moreover, there is a paucity of large-scale, multicenter trials directly comparing the Amsler grid with modern diagnostics in real-world primary care settings. Future research should focus on standardizing administration methods, determining optimal patient education strategies, and quantifying the long-term impact of home monitoring on disease progression and visual outcomes.

Looking ahead, the integration of the Amsler grid into digital platforms offers promising prospects.[22,47,48] Mobile applications such as Alleye® and Amsler Grid App® incorporate reminder systems, standardized instructions, and data tracking capabilities, potentially overcoming some limitations related to patient adherence and reporting accuracy. Combining such tools with artificial intelligence could enhance sensitivity through automated pattern recognition and enable continuous remote monitoring.[49] Nonetheless, digital versions must be validated in diverse populations and tested for usability across different age groups to ensure equitable benefit.

The Amsler grid remains a valuable complementary tool for macular disease detection and monitoring, particularly in resource-limited and primary care settings. Its strengths lie in accessibility and patient empowerment, while its main weaknesses relate to variable sensitivity and reliance on subjective interpretation. Maximizing its benefits at the community level could involve implementing public education campaigns focused on high-risk populations, providing training for primary care providers in proper test administration and interpretation, integrating the tool into teleophthalmology frameworks for remote monitoring, and developing hybrid screening models that combine Amsler grid use with advanced imaging for confirmatory diagnosis.

Such multi-level strategies could expand the reach of early macular disease detection, reduce the incidence of preventable vision loss, and enhance patient engagement in ocular health management.

Conclusions

The Amsler grid test remains a relevant and valuable tool for the early detection and monitoring of macular disorders. Despite advancements in ophthalmic imaging, its simplicity, low cost, and ease of use make it especially suitable for primary care settings and patient-led self-monitoring. Studies confirm its diagnostic utility across various retinal pathologies, including AMD, CSCR, and ERM, highlighting its role as a complementary method where advanced diagnostics are unavailable. The integration of the Amsler test into digital platforms may further enhance its accuracy, usability, and accessibility, supporting broader screening strategies. Its application in routine general practice could facilitate earlier recognition of visual disturbances, enabling timely referral to specialists and potentially improving long-term visual outcomes. Ongoing innovation and structured patient education will be key to maximizing the clinical value of the Amsler grid in both traditional and modern healthcare contexts.

Abbreviations

AMD, age-related macular degeneration; NV, choroidal neovascularization; CSCR, central serous chorioretinopathy; ERM, epiretinal membrane; FFA, Fundus Fluorescein Angiography; iAMD, intermediate age-related macular degeneration; MD, mean deviation; MH, macular hole; PHP, Preferential Hyperacuity Perimetry; OCT, optical coherence tomography.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Midena E, Vujosevic S. Metamorphopsia: an overlooked visual symptom. *Ophthalm Res*. 2015;55:26–36. doi:10.1159/000441033
2. Pandey A, Raina AV, Sharma P. A study on amsler's grid in acquired macular disorders. *Ophthalmol Res*. 2016;6:1–7. doi:10.9734/OR/2016/28850
3. Gessesse GW, Tamrat L, Damji KF. Amsler grid test for detection of advanced glaucoma in Ethiopia. *PLoS One*. 2020;15(3). doi:10.1371/journal.pone.0230017
4. Balaskas K, Drawnel F, Khanani AM, Knox PC, Mavromaras G, Wang YZ. Home vision monitoring in patients with maculopathy: current and future options for digital technologies. *Eye*. 2023;37:3108–3120. doi:10.1038/s41433-023-02479-y
5. Zeppieri M, Marsili S, Enaholo ES, et al. Optical coherence tomography (OCT): a brief look at the uses and technological evolution of ophthalmology. *Medicina*. 2023;59(12). doi:10.3390/medicina59122114
6. Pondorfer SG, Heinemann M, Wintergerst MWM, et al. Detecting vision loss in intermediate agerelated macular degeneration: a comparison of visual function tests. *PLoS One*. 2020;15(4). doi:10.1371/journal.pone.0231748
7. Schwartz R, Loewenstein A. Early detection of age related macular degeneration: current status. *Int J Retina Vitreous*. 2015;1. doi:10.1186/s40942-015-0022-7.
8. Diab M, Nassar M, Badawi N. Resurrection of the Amsler chart in macular diseases. *Menoufia Med J*. 2015;28:174. doi:10.4103/1110-2098.155983

9. Stahl A. Diagnostik und Therapie der altersabhängigen Makuladegeneration. *Dtsch Arztebl Int*. 2020;117(29–30):513–520. doi:10.3238/arztebl.2020.0513
10. Kalinowska A, Nowomiejska K, Brzozowska A, Maciejewski R, Rejdak R. Metamorphopsia score and central visual field outcomes in diabetic cystoid macular edema. *Biomed Res Int*. 2018;2018:1–10. doi:10.1155/2018/4954532
11. Suwal B, Khadka D, Shrestha A, Suwal R, Khatri B. Quantification of metamorphopsia in resolved idiopathic central serous chorioretinopathy: an analysis using M-CHARTS, Amsler Grid, and optical coherence tomography. *Clin Ophthalmol*. 2024;18:937–942. doi:10.2147/opth.s456556
12. Herse P. Pituitary macroadenoma: a case report and review. *Clin Exp Optometry*. 2013;97. doi:10.1111/cxo.12099.
13. Crossland M, Rubin G. The Amsler chart: absence of evidence is not evidence of absence. *Br J Ophthalmol*. 2007;91(3):391.
14. Bjerager J, Schneider M, Potapenko I, et al. Diagnostic accuracy of the Amsler grid test for detecting neovascular age-related macular degeneration: a systematic review and meta-analysis. *JAMA Ophthalmol*. 2023;141(4):315–323.
15. Prea SM, Kong GYX, Guymer RH, Sivarajah P, Baglin EK, Vingrys AJ. The short-term compliance and concordance to in clinic testing for tablet-based home monitoring in age-related macular degeneration. *Am J Ophthalmol*. 2022;235:280–290. doi:10.1016/j.ajo.2021.09.003
16. Rai BB, Morley MG, Bernstein PS, Maddess T. Severity of age-related macular degeneration at first presentation in Bhutan: a 3-year national study. *BMC Ophthalmol*. 2022;22(1):298. doi:10.1186/s12886-022-02520-w
17. Schmid M, Faes L, Bachmann L, Thiel M. Accuracy of a self-monitoring test for identification and monitoring of age-related macular degeneration: a diagnostic case-control study. *Open Ophthalmol J*. 2018;12:19–28. doi:10.2174/1874364101812010019
18. Dave S, Rathore M, Campbell P, et al. Views and opinions of patients with glaucoma and age-related macular degeneration on vision home-monitoring: a UK-based focus group study. *BMJ Open*. 2024;14:e080619. doi:10.1136/bmjopen-2023-080619
19. Khurana RN, Hoang C, Khanani AM, Steklov N, Singerman LJ. A smart mobile application to monitor visual function in diabetic retinopathy and age-related macular degeneration: the CLEAR study. *Am J Ophthalmol*. 2021;227:222–230. doi:10.1016/j.ajo.2021.03.033
20. Parmar UPS, Surico PL, Singh RB, et al. Artificial Intelligence (AI) for early diagnosis of retinal diseases. *Medicina*. 2024;60. doi:10.3390/medicina60040527
21. Gbadegesin TM, Olawoye O, Sarimiye TF, Idowu OO, Ajayi BGK. Amsler grid versus 10-2 test in primary open angle glaucoma. *J West Afr College Surg*. 2023;13(2). doi:10.4103/jwas.jwas_275_22
22. Boon J, Rojas-Carabali W, Asad Y, Lim JTY, Rajagopalan R, Agrawal R. Evaluation of a digital Amsler grid (PocDoc) for macular disease screening: a comparative analysis with the conventional method. *Ophthalmol Ther*. 2024;13(5):1289–1301. doi:10.1007/s40123-024-00910-5
23. Arndt C, Rebollo O, Séguinet S, Debruyne P, Caputo G. Quantification of metamorphopsia in patients with epiretinal membranes before and after surgery. *Graefes Arch Clin Exp Ophthalmol*. 2007;245(8):1123–1129. doi:10.1007/s00417-006-0505-1
24. Hayreh SS, Zimmerman MB. Nonarteritic anterior ischemic optic neuropathy: natural history of visual outcome. *Ophthalmology*. 2008;115(2):298–305.e2. doi:10.1016/j.ophtha.2007.05.027
25. Su D, Greenberg A, Simonson JL, et al. Efficacy of the Amsler grid test in evaluating glaucomatous central visual field defects. *Ophthalmology*. 2016;123(4):737–743. doi:10.1016/j.ophtha.2015.12.003
26. Loewenstein A, Ferencz JR, Lang Y, et al. Toward earlier detection of choroidal neovascularization secondary to age-related macular degeneration: multicenter evaluation of a preferential hyperacuity perimeter designed as a home device. *Retina*. 2010;30(7). doi:10.1097/iae.0b013e3181d1a75e
27. Klatt C, Sendtner P, Ponomareva L, et al. Diagnostik von Metamorphopsien bei Netzhauterkrankungen unterschiedlicher Genese. *Der Ophthalmolog*. 2006;103(11):945–952. doi:10.1007/s00347-006-1381-0
28. Kampmeier J, Zorn MMC, Lang CK, Botros YTH, Lang GE. Vergleich des preferential-hyperacuity-perimeter (PHP)-tests mit dem Amsler-netz-test bei der diagnose verschiedener stadien der altersbezogenen makuladegeneration. *Klin Monbl Augenheilkd*. 2006;223(9):752–756. doi:10.1055/s-2006-926880
29. Üşümüş SAK, Altıntaş AGK, Özdemir A, Aypak C. Using the Amsler grid test for age-related macular degeneration screening. *Turk J Ophthalmol*. 2024;54(1):11. doi:10.4274/tjo.galenos.2023.04238
30. Chaikitmongkol V. Home Monitoring for Age-Related Macular Degeneration. In: Chhablani J, editor. *Choroidal Neovascularization*. Singapore: Springer Singapore; 2020:363–373. doi:10.1007/978-981-15-2213-0_26
31. Wiggins MN, Uwaydat SH. Applied Evidence. *J Fam Pract*. 2006;55:1.
32. Tripathy K. Grid SBA. Treasure Island (FL): StatPearls Publishing; 2023.
33. Marmor MF, Kellner U, Lai TYY, Melles RB, Mieler WF. Recommendations on screening for chloroquine and hydroxychloroquine retinopathy (2016 Revision). *Ophthalmology*. 2016;123(6):1386–1394. doi:10.1016/j.ophtha.2016.01.058
34. Claessens D, Grötzinger L, Krüger RV. Veränderung von Teilaspekten der sehbezogenen Lebensqualität nach 3-monatiger Verwendung einer App zur Kategorisierung von Metamorphopsien. *Klin Monbl Augenheilkd*. 2022;240(09):1091–1097. doi:10.1055/a-1809-5125
35. Chaudhuri M, Hassan Y, Bakka Vemana PPS, Bellary Pattanashetty MS, Abdin ZU, Siddiqui HF. Age-related macular degeneration: an exponentially emerging imminent threat of visual impairment and irreversible blindness. *Cureus*. 2023;15(5):e39624. doi:10.7759/cureus.39624
36. Elsner AE, King BJ. Screening for macular disorders: the optometrist's perspective. *Clin Optom*. 2015;7:15–38. doi:10.2147/OPTO.S52482
37. Hanumunthadu D, Benedicte L, Myles J, et al. Clinical update on metamorphopsia: epidemiology, diagnosis and imaging. *Curr Eye Res*. 2021;46(12):1777–1791. doi:10.1080/02713683.2021.1912779
38. Mitchell J, Bradley C. Quality of life in age-related macular degeneration: a review of the literature. *Health Qual Life Outcomes*. 2006;4. doi:10.1186/1477-7525-4-97.
39. Kiruthika M, Malathi G. A comprehensive review on early detection of drusen patterns in age-related macular degeneration using deep learning models. *Photodiagnosis Photodyn Ther*. 2025;51:104454. doi:10.1016/j.pdpdt.2024.104454
40. Boopathiraj N, Wagner I, Dorairaj S, Miller D, Stewart M. Recent updates on the diagnosis and management of age-related macular degeneration. *Mayo Clin Proc Innov Qual Outcomes*. 2024;8:364–374. doi:10.1016/j.mayocpiqo.2024.05.003
41. Gopinath B, Flood VM, Kifley A, Liew G, Mitchell P. Smoking, antioxidant supplementation and dietary intakes among older adults with age-related macular degeneration over 10 years. *PLoS One*. 2015;10(3). doi:10.1371/journal.pone.0122548
42. Flaxel CJ, Adelman RA, Bailey ST, et al. Age-related macular degeneration preferred practice pattern®. *Ophthalmology*. 2020;127(1):P1–65. DOI:10.1016/j.ophtha.2019.09.024
43. Prem Senthil M, Khadka J, Gilhotra J, Simon S, Pesudovs K. Exploring the quality of life issues in people with retinal diseases: a qualitative study. *J Patient Rep Outcomes*. 2017;1. doi:10.1186/s41687-017-0023-4.

44. Sharkiya S. Quality communication can improve patient-centred health outcomes among older patients: a rapid review. *BMC Health Serv Res*. 2023;23. doi:10.1186/s12913-023-09869-8.
45. Lombardo M, Serrao S, Lombardo G. Challenges in age-related macular degeneration: from risk factors to novel diagnostics and prevention strategies. *Front Med Lausanne*. 2022;9-2022. doi:10.3389/fmed.2022.887104.
46. Chen Q, Leng T, Niu S, Trucco E. Editorial: generalizable and explainable artificial intelligence methods for retinal disease analysis: challenges and future trends. *Front Med*. 2024;11. doi:10.3389/fmed.2024.1465369.
47. Chloé C, Sandy L, Sophie N, Charlotte R, Jean-Pierre D, Sandrine A. Is current age related macular degeneration self-monitoring a good tool for detecting exudative recurrence ? L'autosurveillance actuellement proposée dans la dégénérescence maculaire liée à l'âge est-elle un bon outil de dépistage de la récidive exsudative ? Efficacy of age related macular degeneration self-monitoring Efficacité de l'autosurveillance de la dégénérescence maculaire liée à l'âge. *J Français d'Ophtalmol*. 2019. doi:10.1016/j.jfo.2019.02.017
48. Rogalska A, Kurzak E. Mobile phone applications used to monitor age-related macular degeneration. *Annales Acad Med Silesiensis*. 2025;79:17–23. doi:10.18794/aams/195983
49. Sivaprasad S, Banister K, Azuro-Blanco A, et al. Diagnostic accuracy of monitoring tests of fellow eyes in patients with unilateral neovascular age-related macular degeneration: early detection of neovascular age-related macular degeneration study. *Ophthalmology*. 2021;128 (12):1736–1747. doi:10.1016/j.ophtha.2021.07.025
50. Mohaghegh N, Ghafar-Zadeh E, Magierowski S. Recent advances of computerized graphical methods for the detection and progress assessment of visual distortion caused by macular disorders. *Vision*. 2019;3(2):25. doi:10.3390/vision3020025
51. Skrzypecki J, Stańska K, Grabska-Liberek I. Patient-oriented mobile applications in ophthalmology. *Clin Exp Optom*. 2019;102(2):180–183. doi:10.1111/cxo.12830
52. Schachat AP, Thompson JT. Optical coherence tomography, fluorescein angiography, and the management of neovascular age-related macular degeneration. *Ophthalmology*. 2015;122:222–223. doi:10.1016/j.ophtha.2014.09.015
53. Goh C, Puah M, Toh ZH, et al. Mobile apps and visual function assessment: a comprehensive review of the latest advancements. *Ophthalmol Ther*. 2025;14(1):23–39. doi:10.1007/s40123-024-01071-1